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1994

ALCOHOLISM, PSYCHOPATHOLOGY AND SENSATION-SEEKING: DIFFERENCES BETWEEN MALE DUI FIRST OFFENDERS AND RECIDIVISTS

by

William Stephen Astley

Dissertation Submitted to the Faculty of the
University of Pittsburgh Graduate School of Social Work
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Doctor of Philosophy

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1994

ALCOHOLISM, PSYCHOPATHOLOGY AND SENSATION-SEEKING:
DIFFERENCES BETWEEN MALE
DUI FIRST OFFENDERS AND RECIDIVISTS

William Stephen Astley, Ph.D.
University of Pittsburgh, 1994

ABSTRACT

The purpose of the study was to examine the DUI offender from the Problem-Behavior Theory perspective, attempting to identify factors that contribute to DUI recidivism. Three groups, including non-DUI alcoholics (n= 52), first time offenders (n=122) and recidivists (n=122) were compared on a number of psychosocial and demographic variables. Twelve scale scores were reduced to three factors, including Psychological Distress, Alcohol Problems and Impulsivity/sensation-seeking behavior.

As hypothesized, the alcoholics and recidivists had more alcohol problems than the first time offenders. The second hypothesis, that recidivists would have more psychological distress than the other two groups was not upheld. In fact, the non-DUI alcoholics displayed more psychological problems. Finally, the third hypothesis, that recidivists would score higher on impulsivity/sensation-seeking behavior was not upheld. The non-DUI alcoholics scored highest and the recidivists scored lowest.

A variety of information was gained about DUI offenders through the examination of four exploratory questions. The first used stepwise discriminant analysis to learn that DUI offenders can be differentiated into high and low risk groups by observing the characteristics of non-DUI alcoholics, first time offenders and recidivists. Group classification was determined and new cases were able to be classified by observing the residuals from the classification matrix. Next, it was determined that Alcohol and

Psychological Distress contributed the most to group differentiation and Impulsivity/sensation-seeking contributed a lessor amount.

A multiple regression analysis found that the three factors accounted for 14% of the variance in the number of times a person drove under the influence, regardless of being caught. Finally, the Mortimer-Filkins test was found to effectively discriminate between first time offenders and recidivists but the cutoff scores were too low to benefit treatment agencies.

The conclusions from the study are that multiple characteristics and behaviors contribute to DUI behavior. The most effective treatment programs will recognize this and develop curricula that incorporates multiple issues, including alcohol, psychological, impulsivity, and sensation-seeking. Naturally, alcohol issues must be the primary focus, but the other factors contribute to the DUI behavior and are integral to a successful treatment program.

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Chapter 1

Introduction

Overview

For the past decade drunk driving has been under attack in the United States. Earlier studies by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (1973) and the U.S. Department of Transportation's National Highway Traffic Safety Administration (1968) verified the connection between drunk driving and fatal auto accidents. This data, in turn, gave sanction to victim support groups such as Mothers Against Drunk Driving (MADD), Remove Intoxicated Drivers (RID) and Students Against Drunk Driving (SADD). The public outcry prompted the Presidential Commission on Drunk Driving (1982) to call for numerous policy changes to rid the roads of drunk drivers. In spite of the fact that many of these changes were adopted by the states and have been implemented in state drunk driving programs, driving under the influence (DUI) accidents continue at an alarming rate (U.S. Department of Transportation, 1993). Of particular concern is the fact that 20 - 25% of the identified drunk drivers are recidivists who have participated in some sort of educational or treatment program specifically directed at preventing further DUI's. More alarming is the fact that recidivists are involved in 45 - 50% of fatal accidents where one or more of the drivers was intoxicated. Finally, research has shown that recidivists account for the majority of the DUI offenders who are involved in fatal accidents and who are jailed as a result of various DUI activity (Pennsylvania Commission on Crime and Delinquency, 1988).

The increased attention on DUI offenders has led to efforts to identify a psychosocial profile of the offender in order to develop and improve appropriate treatment strategies.

Earlier research by Selzer, Vinoker, and Wilson (1977) revealed that there were significant differences in a number of personality and behavioral characteristics between DUI offenders, alcoholics, and a control group of non-offenders who had applied for routine license renewal. Studies on alcoholism and driving have shown that a high percentage of DUI recidivists meet the DSM-III-R criteria for alcoholism (Volpe, 1983). Other existing research has focused on delineating DUI subtypes based on personality, environment and behavior categories (Donovan & Martlatt, 1983). Some effort has been made to differentiate among first time offenders and recidivists on groups of these variables (McMillen, Adams, Wells-Parker, Pang, & Anderson, 1992; Myatt, 1990; Macdonald, 1987). Finally, another avenue of exploration shows high sensation-seeking behavior in recidivists (Horvath & Zuckerman, 1993; Jessor, 1987). Several studies (Donovan, Umlauf & Salzberg; Swisher; Wilson & Jonah, 1988; Jessor, 1987) have proposed that DUI offenders manifest several types of problem behaviors, in addition to driving under the influence, and that this combination of behaviors, in conjunction with high risk factors such as alcoholism, are found in higher proportions in DUI offenders. A profile of these behaviors can be useful in differentiating high risk DUI offenders who may commit repeat offenses.

The purpose of this study is to expand the psychosocial profile of the offender, recognizing that multiple factors contribute to DUI, and to continue to examine the differentiation between first time offenders and recidivists on a number of psychosocial and behavioral characteristics. In particular, the relationship between factored scores measuring alcoholism, several types of psychopathology, and impulsivity/sensation-seeking behavior will be assessed. The study will examine characteristics of first time offenders, recidivists, and non-DUI alcoholics and attempt to develop a model to identify first time offenders who are likely to become recidivists. In addition, a number of demographic variables will be included as control variables.

Statement of the Problem

In 1982, 56.7% of all fatal automobile crashes occurring in the United States were alcohol related. This percentage improved to 47.9% by 1991 (U.S. Department of Transportation, 1993) but this still represented a staggering number of potentially preventable deaths . As noted above, 20 - 25% of DUI offenders are recidivists and over 50% of DUI offenders involved in fatal accidents are recidivists. Extensive research in the past 30 years has documented the deleterious effects alcohol has on driving and this, in turn, led to countermeasures aimed at stopping drunk driving. Federal grants provided incentives for states to improve their drunk driving laws, requiring even first offenders to be evaluated and attend special educational classes aimed at reducing drunk driving. For the most part, these classes focus considerable attention on alcohol awareness and alcoholism since this has been identified as a major characteristic of drunk drivers (Vingilis, 1983) .

The success of the DUI programs has been mixed and is difficult to measure because other countermeasures such as public education and the deglamorazation of alcohol may also reduce drunk driving. One clear measure of the programs' failure, however, is the large number of people who receive subsequent DUIs after completing these programs. Accurate percentages of the number of first time offenders who commit subsequent DUIs is difficult to determine because recidivists are managed in several ways in the criminal justice system. Some are offered alternatives to prison through local rehabilitative programs while others are sentenced directly to prison terms. Most states track these cases separately, making it difficult to identify all the recidivists. In any event, these recidivists are the focus of much public attention, especially when they, not uncommonly, are involved in horrendous accidents. At these times the effectiveness of the educational or treatment programs is questioned.

Research has documented the failure of DUI programs to prevent recidivism in certain types of offenders, like chronic alcoholics, although not all chronic alcoholics are

DUI recidivists. On the other hand, there has been much success with certain types of first time offenders who attend similar programs. The problem, then, is to differentiate the types of individuals who will and will not benefit from education and treatment programs and to determine why some individuals do not benefit from the programs. Because many treatment programs focus on alcohol awareness and alcoholism treatment, it is important to determine whether alcoholism is the primary condition that determines an offender's behavior or whether the DUI behavior is the result of a combination of several characteristics or behaviors.

In Pennsylvania and many other states, the primary assessment tool used to evaluate DUI offenders is the Mortimer-Filkens Test. This instrument is designed specifically to identify alcohol problems in DUI offenders. Results of this evaluation are completed at the county level and forwarded to the state Bureau of Motor Vehicles where they are paired with other information about the offender's driving record. A recommendation for one of three levels of education or treatment is then returned to the county and eventually to a treatment facility. While the treatment facility has the option to change the level of treatment, the decision is generally made based on the level of the alcohol problem rather than other factors. Success of the treatment program depends, in part, on the accurate determination of the level and type of education or treatment needed. It also hinges on whether alcohol problems are the primary factor that influence the offender's behavior. In the case of the recidivist, it may not be the only critical factor. A large part of the problem, then, is to identify the factors, or characteristics, that differentiate first time offenders who may benefit from treatment, from recidivists who fail to benefit from treatment (fail to avoid further DUIs). Identification of these characteristics will allow future first time offenders to be screened into high or low risk groups for future DUI potential. Also, it will allow DUI programs to tailor education and treatment to address other characteristics, as well as alcoholism, that contribute to the DUI behavior.

One perspective that must be addressed is the definition of a DUI offense and, in fact, that of a repeat offense. From a legal perspective, a driving under the influence offense means that an individual has been "caught" operating a motor vehicle with more than a specified amount of drugs or alcohol in his body. A repeat offense is the same situation occurring within a specified period of time (usually several years). The operative term in this definition is "caught". It is well established that many individuals frequently drive far in excess of the legally allowable drug or alcohol level. The fact that they have not been caught driving under the influence relegates the incident to an offense of the conscience, with no legal consequences. Some researchers have estimated that the average DUI offender has driven under the influence between 200 and 2000 times before being apprehended (Gusfield, 1988). This results in the unusual situation wherein a "first time offender" would more appropriately be labeled a "first time caught" offender and may have actually driven under the influence many times in the past. In fact, a recidivist, from this perspective, would be labeled a "second (third, or more) time caught" offender and may have driven under the influence far fewer times than the "first time caught" offender. On any given weekend night between the hours of 10:00 P.M. and 2:00 A.M. the proportion of the number of drunk drivers on the road to the number of police officers is so low that the odds of being apprehended is literally minuscule unless one is involved in an accident. This compels one to ask if it is possible or even realistic to differentiate between first time offenders and recidivists when the number of times an offender is actually caught may be due to chance more than other factors. Selzer et al. (1977) asked a similar question and found that there were, indeed, significant differences between DUI offenders, non-DUI alcoholics, and a control group. The DUI offenders who were apprehended displayed different characteristics than the other groups even though there may have been a substantial chance factor in their arrest. In a legally oriented article, Jacobs (1990) makes a clear point by stating,

> ...anyone could be feckless, unlucky, or irresponsible enough to drive drunk on a single occasion. Once having been caught, however, and given a 'warning' via a rather lenient set of sanctions, the reasonable and normal person would not commit the offense again; the only people who would commit the offense again are those who are anti-social or pathologically involved with alcohol (p. 208).

This leads to the idea that there may, indeed, be something that sets out the DUI offender, and the DUI recidivist in particular, from others with alcohol proble[illegible]o do not get caught in DUI offenses. The search for this special set of characteristics or behaviors has been the topic of recent research and forms the basis for this study.

Rationale for the Study

Identifying critical characteristics that differentiate first time offenders from recidivists allows a predictive model to be developed. Known levels of certain characteristics found to be associated with recidivism can be used to identify first offenders who are high risk to repeat the DUI offense.

Identifying discriminating characteristics addresses the DUI problem from a primary prevention perspective. It focuses on prevention efforts in the identified population of first time offenders and aims to prevent future occurrences. Primary prevention is the most direct and cost effective form of prevention because it centers directly on the target population of first time offenders. It is more focused, for instance, than secondary prevention which addresses groups that have not committed a DUI but are high risk to do so. Examples of such groups are teen drivers and alcoholics. While secondary prevention is very useful preventing DUIs from occurring in a high risk population, it focuses considerable resources on individuals who may never drive under the influence. Even more generalized though, is tertiary prevention, which is a broad scale prevention effort directed at the public at large. Beverage commercials stressing the dangers of driving after drinking are examples of tertiary prevention. Primary prevention, then, is the most direct approach, focusing on the immediate population of first time offenders.

This study will examine the characteristics of DUI offenders so that a primary prevention model can be used to prevent future DUI occurrences. This can be accomplished by developing a model that differentiates first time offenders who are high risk for becoming recidivists.

Using the primary prevention approach also takes advantage of the availability of the target population. Stricter DUI enforcement and punishment laws are ensuring that most apprehended DUI offenders participate in some type of education or treatment program. For example, "per se" laws determine that an individual is presumed driving under the influence if their blood or breath alcohol level is above a specified limit (usually .10) or if they refuse to submit to a test (Farrell, 1989). Most DUI cases, therefore, are not heard in court, where they could be plea bargained down to lesser offenses. In Pennsylvania, only 10% of DUI defendants were found not guilty or had charges dismissed in 1990 (Pennsylvania Commission on Crime and Delinquency, 1993). This ensures that most DUI offenders participate in education or treatment programs, creating a robust population. An important rationale for the study, then, is to work with first time offenders because they are readily available through the education and treatment programs.

While prevention of all DUIs through secondary and tertiary prevention efforts is the ultimate goal, we return to the logic of preventing recidivism through primary prevention methods by focusing on high risk first time offenders. It is presumed that some of these individuals may continue to commit DUI offenses unless there is some intervention or disincentive. In this study the rationale for identifying recidivists by observing first time offenders is a simple one. All recidivists must start somewhere. At some point all recidivists were first time offenders. The population of first time offenders, then, contains members who will never again drink and drive as well as members who will repeatedly drink and drive. This study aims at differentiating first time offenders into two groups - those who are likely not to repeat the DUI offense, and those who are likely to repeat, depending on specified personality characteristics or environmental factors. By accomplishing this, more intense efforts can be directed at those first time offenders who are truly high risk to become recidivists. A rationale for the study, then, is that it may be possible to identify future recidivists when they are still first time offenders.

In summary, the rationale for the study follows the notion that repeat DUI offenders can be identified by testing first time offenders. Measurement of known characteristics of repeat offenders in first time offenders allows one to identify first time offenders who are high risk to repeat the offense. Testing first time offenders to identify potential repeat offenders utilizes a primary prevention approach, which is the most direct method to prevent the occurrence of behavior.

Jessor's Problem-Behavior Theory

Problem-Behavior Theory (Jessor & Jessor, 1977) offers a theoretical framework for this research study. The theory views negative behavior as a result of the combined effect of several characteristics. Much of Jessor's early work focused on identifying the characteristics in adolescents that resulted in negative behavior. Since its initial development, Problem-Behavior Theory has been shown to explain other forms of problem behavior in adults as well as adolescents. Recent accounts (Jessor, 1987; Swisher; Wilson & Jonah, 1988) have applied the theory to risky driving and drunk driving behavior both in adolescents and young adults (the population responsible for a high percentage of the drunk driving in the United States). From this perspective they define problem behavior as behavior that departs from the legal and social norms of the larger society. That is, it is behavior that is socially disapproved by the institutions of authority and tends to elicit some form of social control response, whether mild reproof, social rejection, or even incarceration (Jessor, 1987). In the larger sense, Jessor and

Jessor (1977) concludes that it is advantageous to view problem behavior as a nexus at which diverse sources of influence including personal, social, institutional, and behavioral influences intersect. It provides, therefore, a uniquely illuminated arena for the analysis of more general issues involved in the sociopsychological explanation of human action.

Jessor and Jessor (1977) describe three systems of psychosocial influence in Problem-Behavior Theory - the personality system, the perceived environment system, and the behavior system. The theory rests on the social-psychological relationships that occur within and between these three systems. The structure of the variables in each system are interrelated and organized to create a dynamic state that results in a greater or lesser likelihood of occurrence of problem behavior . An individual's behavior in each system is described as an instigation to engage in problem behavior or a control against the behavior, resulting in a descriptor Jessor labels "problem behavior proneness" (1987, p. 2), which specifies the likelihood of normal or problem behavior. Furthermore, this concept of proneness is synonymous with the concept of risk, leading to the idea that the variables in the three systems of psychosocial influence are seen as psychosocial risk factors for problem behavior. Aspiring to the basic concepts of Lewin's field theory (Jessor & Jessor, 1977), that all behavior is the result of an interaction between the person and environment, Problem-Behavior Theory examines proneness to problem behavior in the personality, perceived environment and behavior systems to explain resultant actions. Jessor asserts that problem behaviors co-vary, are interrelated and often form part of a more general behavioral lifestyle. In this study the theory will be used to explain the interrelatedness between various psychosocial and behavioral characteristics and drunk driving behavior.

In Jessor's original work, proneness to problem behavior in the personality system is associated with greater value on independence relative to value on academic achievement, lower expectations for academic achievement, greater social criticism and alienation, an external locus of control orientation and lower self-esteem, greater attitudinal tolerance of deviance, lesser religiosity, and more importance on positive relative to negative functions of problem behavior (1977). Proneness to problem behavior in the perceived environment system includes low parental support and controls, low peer controls, low compatibility between parent and peer expectations, low parent versus peer influence, low parental disapproval of problem behavior and high friends models and approval for engaging in problem behavior (1977). Finally, the original concept of proneness to problem behavior in the behavior system included, activism, drug use behavior, sexual behavior, frequent drunkenness, driving while drinking, stealing, lying, property destruction and aggression (1977). In an application of Problem-Behavior Theory to risky driving, Jessor further discusses proneness to problem behavior in the behavior system as having higher involvement in other problem behaviors than the one being predicted or explained, and lower involvement in conventional behavior (1987).

Expanding the concept of problem behavior to include risky driving resulted in additional behavioral domains. Jessor (1987) examined problem behavior, health compromising behavior and psychopathology role failure. In the case of the latter, those behaviors related to risky driving included drunk driving, anxiety, obsessiveness, depression, apathy-withdrawal, and inability to cope with stress. Drunk driving, one form of risky driving, was correlated with increases in these variables.

In an application of Problem-Behavior Theory to risky driving, Wilson and Jonah (1988) found that the perceived environment system was less of an influence on behavior as adolescents moved away from the influence of their parents and that this was the case in most DUI offenders. For this and other reasons, the influence of the perceived environment system is minimal. The cluster of variables that most strongly influences risky driving belongs to the behavior system, with variables from the personality system somewhat influential.

The present study will expand on the variables that influence the types of problem behavior that results in drunk driving. It postulates that the characteristics of first time offenders are different from those of recidivists and that the characteristics of non-DUI alcoholics are different from those who have committed one or more DUIs. The study is consistent with Problem-Behavior Theory because it examines the contribution of several variables toward the elicitation of a problem behavior.

Chapter 2

Review of Related Research

The relatively recent increase in public sensitivity about drunk driving and the publicity of the tragic consequences drunk driving brings has led to a number of research studies on the subject. At least one professional journal, Alcohol, Drugs, and Driving, is solely dedicated to the topic of driving under the influence. Other journals including Accident Analysis and Prevention and Risk Analysis regularly cover DUI issues, leading to a robust pool of research. This literature review will focus on research that is specifically related to the characteristics of DUI offenders or research that relates to the proposition that DUI recidivists can be identified from a pool of first time offenders by measuring certain characteristics and behaviors.

The research on the characteristics of DUI offenders includes a wide range of variables. Earlier efforts focused on alcoholism as the primary factor that influenced DUI behavior, but other studies found that there were many alcoholics who did not have a problem with DUIs, leading one to conclude that other contributing variables must be present. Comparisons of demographic variables were somewhat useful in describing the "typical DUI offender" but they did not explain why the DUI behavior occurred. Later studies began to explore psychological and personality characteristics that, combined with alcoholism, resulted in a greater likelihood that DUI behavior would occur. Some of these variables included: depression, anxiety, sociopathy, hostility, aggression, paranoia, low frustration tolerance, low level of assertion, external locus of control, sensation or thrill seeking, and impulsivity. The following review of the literature will examine many of these variables in the context of DUI behavior. Their impact on DUI behavior and the ways they can be used to differentiate among levels of DUI behavior will be explored.

Studies Comparing DUI Offenders and the General Population

One of the earliest studies that attempted to differentiate DUI offenders from alcoholics as well as a control group of normal drivers was completed by Selzer, Vinoker, and Wilson (1977). The authors sought to determine whether DUI behavior was a random event or whether DUI offenders presented specific characteristics that set them out from others. The three groups were tested on a number of variables including alcoholism, reasons for drinking, depression, aggression, paranoia, self-esteem, coping behaviors, stress symptoms, family and job problems, and suicidal proclivity. The results showed that the DUI offenders were clearly distinguishable from the other two groups. The DUI group was significantly different from the other two groups in drinking behavior, motivation for drinking and its perceived consequences. The DUI group was also more depressed, had less self-esteem, was more paranoid and more aggressive than the controls, but less extreme on all these measures than the alcoholics. Finally, the DUI offenders were heavier drinkers, experienced more troublesome effects from drinking and drank more for tension relief than the control group. Although this study did not differentiate between level of DUI offense (first time offenders versus recidivists), it clearly establishes some homogeneity among DUI offenders as a whole. With this established, additional research attempted to differentiate among the group of DUI offenders.

In a 1985 study Brown also showed that DUI offenders on a whole differed from a sample of the general population on a number of measures of personality characteristics . The *four scales that* were used included: the Adjective Checklist, the Multiple Affect Adjective Check List, the Depression Adjective Check List, and the Profile of Mood States. While significant differences were shown between the two groups on a combination of all four scales, no one individual test accurately differentiated the groups.

Brown concluded that a search for a discriminating profile should focus on using the results of a test battery rather than one individual test.

Further supporting the notion that a single test cannot accurately identify DUI offenders, Reynolds, Kunce, and Cope (1991) were not able to differentiate between first time offenders and repeat offenders using the Michigan Alcoholism Screening Test alone. By adding the Personal Styles Inventory they found that 64 repeat DUI offenders differed significantly from 174 first time offenders on 12 of 24 normal personality characteristics. Saltstone (1989) was also able to differentiate DUI offenders, DUI inmates, alcoholics and other inmates when he combined a shortened form of the MMPI and an alcohol dependency scale. Differentiation with the MMPI alone was not possible. The level of DUI offense, however, was not determined through the testing. Likewise, Craig and Dres (1989) found that the MMPI alone was able to account for only 10% of the variance when predicting DUI recidivism, thus limiting its clinical utility as a sole predictor.

Studies Comparing First Offenders and Recidivists

Even though it was completed less than a decade ago, Obolensky (1984) stands as one of the earlier studies comparing first time offenders with recidivists. His method included using a test battery with first time offenders to identify those who were high risk to become recidivists. The battery included the Michigan Alcoholism Screening Test, the Mortimer-Filkins test, BAC level, history of alcoholism treatment or alcohol arrests, and the presence of specific symptoms of alcoholism. He then experimented with two different treatment methods with the high risk first time offenders and found that only 5% of the subjects in both groups relapsed after nine months, but the experimental group, which received a 16 week skill training program, relapsed at a slower rate. The significance of the study is that it uses a test battery to identify first time offenders who are high risk to repeat. The test battery, however, is strongly oriented to drinking and alcoholism characteristics and behaviors, implying that an assessment of drinking behavior alone can accurately discriminate between first time offenders and recidivists. Another limitation of the study is the relatively short time period between initial testing and measurement of recidivism (nine months). A longitudinal measure of recidivism more accurately approaches the legally accepted limitations. In many states, a subsequent DUI offense is considered a repeat offense if it occurs within eight years of the first offense.

Among the more recent research studies that have explored the differences between DUI first offenders and recidivists, McMillen, Adams, Wells-Parker, Pang, and Anderson (1992) compared first time offenders and multiple offenders on a number of psychosocial characteristics and found that multiple offenders scored significantly higher than first time offenders on measures of hostility, sensation-seeking, psychopathic deviance, mania, and depression and lower on measures of emotional adjustment and assertiveness. Multiple offenders also consumed significantly more alcohol than first time offenders and had higher blood alcohol concentrations at the time of arrest. They also experienced more overall alcohol related problems than first time offenders. Applying the concepts of Problem-Behavior Theory to DUI offenders, McMillen et al. proposed that repeat DUI offenders would persistently display behaviors that cause problems for the individual and society while this type of behavior would only be seen in isolated cases in first time offenders. In particular, the personality traits and behaviors of multiple offenders were found to be different than those of alcohol abusers in general, supporting the Problem-Behavior Theory perspective that repeat DUI offenders display a cluster of problem behaviors rather than one predictable trait or characteristic. From this finding, McMillen et al. concluded that intervention approaches must consider that a cluster of behaviors and characteristics contributes to the DUI behavior. Educational approaches that may be successful with first time offenders, or alcohol focused treatment approaches that do not address the larger cluster of problems are likely to be unsuccessful with multiple offenders. The authors concede that additional research is needed to confirm the differences between first time offenders and multiple offenders and to expand the pool of problem behaviors that characterizes multiple offenders.

In a related study, McMillen, Pang, Wells-Parker and Anderson (1991) further differentiated the cluster of behaviors that characterizes impaired drivers who were arrested following an accident or moving violation as opposed to the characteristics of drivers arrested at a roadblock. The former were found to be significantly higher in measures of hostility, psychopathic deviance, non-traffic arrests, frequency of impaired driving, accidents after drinking, and number of drinks consumed per week. While the present study uses some of the same variables in McMillen, et al. (1992), it adds other variables and uses a third comparison group consisting of non-DUI alcoholics.

Multiple Problem Behavior Perspective of DUI

Johnson and White (1989) expanded Jessor's Problem-Behavior Theory by suggesting that the problem behavior syndrome may be predicted by an underlying dimension of risk-taking. They found that coping use of substances, that is, using substances to cope with stress or personal problems, was the strongest predictor of driving under the influence and that risk-taking/impulsive orientation, both directly and indirectly, as mediated through coping use, was the strongest predictor of receiving a DUI. Johnson et al. used four independent variables in the study. The first was a risk-taking/impulsivity scale formed by combining subscales from Zuckerman's Sensation Seeking Scale and Jackson's Personality Research Form-E. The second variable, negative intrapersonal state, was formed by combining the depression, anxiety and anger/hostility scales of the Symptom Checklist-90-R with two other brief measures. The third variable, stress, was a measure of 47 possible stressors, and coping use, and the final variable, included a four item measure obtained through a factor analysis of 32 items on coping behaviors. Pairing these variables with dependent variables that measure quantity and frequency of alcohol and marijuana use, the authors found that subjects "...who are sensation-seekers, risk-takers, and impulsive in their behavior will use substances more often to cope with problems or tensions and will more often drive impaired" (p. 328). Their findings also contradict previous research that points to heightened levels of stress in DUI offenders. Overall, they support the Problem-Behavior Theory notion that a cluster of negative behaviors and characteristics is responsible for DUI behavior.

Lightsey and Sweeney (1985) examined the range of general life problems experienced by a sample of young DUI offenders (aged 15 - 24) in the state of Mississippi. They found that 73% experienced high (25%) or middle (47%) range alcohol related problems. These results were found to be associated with depressed economic conditions, abusive drinker models, personal drinking behaviors, immature motivations, and prohibitionist socialization factors. Furthermore, high level problem drinking was associated with learned maladaptive coping responses and these type drinkers were found to be more likely to drink for escapist reasons.

In a doctoral dissertation study, Macdonald (1987) explored the psychosocial characteristics of alcoholics in treatment who were arrested for driving while impaired. He compared three groups of male alcoholics: those with no DUIs, those with one DUI, and those with multiple DUIs and found differences between the multiple DUI group and the other two groups. The variables that were measured form a cluster of negative behaviors or characteristics including: aggression, impulsivity, risk-taking, low responsibility, disrespect for authority, major life events, depression, and low self-esteem. On demographic variables, multiple offenders were more likely to be single, lower in socio-economic status, lower in education, and younger. Although they drank less frequently, they drank larger quantities per occasion and reported driving more dangerously after drinking. Multiple offenders also showed more disrespect for authority, had more undesirable life events and described themselves as less socially desirable. The study is significant because it identifies characteristics that are unique to

DUI recidivists, although it has limitations because it focuses on male recidivists who are voluntarily enrolled in an alcohol treatment program.

In another doctoral dissertation, Myatt (1990) uses three comparison groups in a study of the differences between first time offenders, recidivists, and non-DUI alcoholics. Using the human systems perspective, she investigated the extent of drinking problem as measured by the Michigan Alcoholism Screening Test (physiological domain), self-concept, measured by the Tennessee Self-Concept Scale, and moral judgment, measured by the Defining Issues Test (both comprising the cognitive domain) and the extent of narcissistic traits, measured by the Narcissistic Personality Inventory (interpersonal domain). Results of the testing showed that repeat offenders and non-DUI alcoholics had higher alcoholism scores and were more exploitative than first time offenders. Repeat offenders also reported higher self-concept scores than the other two groups. Although Myatt found some differences between the groups, the power of the study is limited by a relatively small sample (N=20) for each of the three groups.

Little and Robinson (1989) extended the notion of multiple problem behaviors contributing to DUI recidivism by exploring the relationship of DUI recidivism to moral reasoning, sensation-seeking, and alcoholism. They utilized the MacAndrew Alcoholism Scale, Zuckerman Sensation Seeking Scale, Life-purpose Scale, and Moral Reasoning Scale with 115 male DUI offenders and found that recidivism correlated positively and significantly with the MacAndrews scores and approached significance on the Sensation Seeking Scale. Recidivism also correlated negatively and significantly with scores on the Moral Reasoning Scale.

A continued search for the collection of variables that distinguishes first time offenders from recidivists was conducted by Beerman, Smith and Hall (1988). The authors grouped 397 offenders into those with one or two DUIs and those with three or more DUIs and found that the group with more DUIs were more likely to be unemployed, to have a past criminal record, to be arrested for drinking and driving on a weekday during afternoon or early evening hours, to drive with a suspended or revoked license and to refuse a blood alcohol test at the time of arrest. They also found that offenders with four or more DUIs fit the descriptive model of alcoholism.

Farrow (1989) addressed the DUI issue from another perspective, studying personality factors associated with DUI in adolescents. By testing non-DUI adolescents, non-DUI juvenile offenders, and DUI adolescents, Farrow found that measures of stressful life events, powerlessness, and coping styles were able to discriminate a high risk population for DUI behavior.

Delving deeper into the effects of personality on drinking problems and drunk driving, Stacy, Newcomb and Bentler (1991) examined the direct effects of personality on drinking problems, the mediating effects, and the moderating effects of alcohol consumption and personality on drinking problems. Each of the three explanations were supported by the results with sensation-seeking and cognitive motivation being the two personality constructs most strongly associated with drinking problems and drunk driving.

Courtney (1988) viewed the issue of impaired driving from a unique perspective. He posited that personality characteristics are instrumental as determinants of driving behavior. Specifically, he noted that the driver's personality may influence safety by limiting the driver's ability to use driving skills to the maximum. A central theme was that higher levels of interpersonal concern and social responsibility are more likely to be found in drivers who adhere to the formal rules of driving while lower levels of these variables would result in drivers who are less likely to adhere to these rules. In addition, Courtney felt that drivers with high levels of social responsibility would be less likely to engage in dangerous driving patterns, including traffic violations and accidents. His research assesses the influences of personality, environmental stress and interpersonal factors on traffic accidents and convictions. He also pointed to previous research by Zylman, Selzer and others that discounted alcohol as the sole source of responsibility in accidents. Rather, it is the alcohol, in combination with personality characteristics and other environmental factors, that together results in accidents. Courtney assessed five domains of driving risk: sensation-seeking, hostility-aggression, blaming, Type A behavior and stressful life events as well as measures of alcoholism and other demographics. He found that personality and cognitive-interpersonal variables added to the predictiveness of driving risk independent of the contribution made by demographic variables. Stress and personality variables, including Type A behavior, blaming style, stress, hostility, thrill seeking and social responsibility, were found to significantly predict future substance abuse driving behavior.

Additional Psychological and Personality Factors Affecting DUI Behavior

While alcoholism or problems with alcohol is clearly associated with a large number of accidents, several of the above studies reveal that alcoholism alone cannot be shown to be the causal agent in the majority of accidents or DUI offenses. Some researchers have explored the impact of depression or the association of depression with alcoholism and its effects on driving. Windle and Miller (1989) recognized that "...within the DWI field there has been a growing interest in those problem drinkers who are, or who are likely to be, recidivists" (p. 412). To this end the researchers examined whether depression was associated with the severity of alcoholic diagnosis among convicted DUI offenders. They also sought to ascertain if gender was associated with severity of depression in the DUI population as it is in the general population. The researchers tested 465 DUI offenders (92% male and 8% female) for alcoholism and depression, placing them in one of three categories regarding their alcohol problem: diagnosed alcohol problem; alcohol abuse; or alcohol dependence. Levels of depressive symptomology were then assessed for each group. The findings showed that depressive symptomology was associated with severity of alcoholism, with alcohol dependent subjects reporting the most severe symptoms. There was also a significant interaction effect between gender and alcoholism in the prediction of depressive symptomology in the alcohol dependent group. While the researchers acknowledge the limitations of the small female sample that was used, the findings have merit as they identify a possible contribution of depression in explaining DUI behavior.

In a related study, Windle and Miller (1990) compared measures of problem drinking and depressive symptomology in DUI offenders on three occasions at nine month intervals. They found that a biphasic process existed with higher levels of depression at Time 1 associated with lower levels of problem drinking at Time 2 and higher levels of problem drinking at Time 1 associated with lower levels of depression at Time 2. The results were the opposite between Times 2 and 3, however, indicating some association between depression and problem level drinking in the sample of DUI offenders.

Another study that compared levels of a drinking problem and depression, as well as other measures of psychopathology including anxiety, paranoia, and psychoticism, was conducted by Sutton (1993). A sample of 186 males and 30 females were tested on the variables and 70% were shown to display a problem with alcohol as measured by the Michigan Alcoholism Screening Test and the MacAndrews scale of the MMPI. On measures of depression, 46% of the males acknowledged multiple depressive symptoms on the Beck Depression Inventory, while 14% scored in the clinically significant range. Furthermore, 91% of the males acknowledged at least some acute depressive symptoms as measured by the Symptom Checklist 90-R and 32% had significant elevations (T=70+). Elevations on other measures of psychopathology were also found with an overall total of 38% of the sample showing signs of clinical psychiatric problems. Sutton contends that DUI offenders with psychiatric problems may seek relief of their emotional symptoms by self-medicating with alcohol. If this is the case, treatment and rehabilitation programs will likely fail unless they address the psychiatric dysfunction as well as any alcohol problems.

In contrast to the above research, Veneziano and Veneziano (1992), in a study of psychosocial characteristics of persons convicted of DUI, found that only a small percentage of the sample experienced current depressive symptoms. In addition, 48.3% reported no previous depressive symptoms while only 7.4% reported five or more previous depressive symptoms (the DSM-III-R level for depression). The researchers also found that recidivists were more likely to be alcohol dependent than first time offenders and had experienced more psychosocial stressors in the past year than first time offenders.

A study of the prevalence of psychological symptoms in alcoholics showed that alcoholics experience two to five times more symptoms than the general population (Mercier, Brochu, Girard, Gravel, Ouellet & Paré, 1992). Using the Symptom Checklist 90-Revised, the authors found that alcoholics scored highest on the depression scale, followed by other high scores on the obsessive-compulsive, interpersonal sensitivity and anxiety scales. The most marked divergence from the general population was on the psychoticism scale with alcoholics scoring five times higher than in the general population. The authors identify a study by Derogatis, Lipman and Covi (1973) which found that 44 male alcoholics experienced significantly more symptoms on the SCL-90 than the general population, with the highest scores on the depression, paranoid ideation, anxiety and somatization dimensions. In another study using the SCL-90-R, Schafer, Sobieraj and Hollyfield (1987) found significant correlations between severity of alcoholism and the obsessive-compulsive, interpersonal sensitivity, hostility, paranoid ideation and psychoticism scales.

DUI Offenders as Risky Drivers

A number of researchers have studied the characteristics of DUI offenders from the perspective of risky driving. As discussed earlier, Jessor (1987) applied the principles of

Problem-Behavior Theory to risky driving, and specifically, to driving under the influence, stating,

> The concept of 'risky driving' is one way to organize those actions and practices that increase the likelihood of traffic crashes. It is a notion that, while encompassing the use of alcohol and other drugs, also incorporates a large set of other risk-prone driving behaviors...risky driving may be an element or component of a larger repertoire of norm-violative behavior (p.iii).

The application of Problem-Behavior Theory to risky driving has sparked several credible studies that focus on the behaviors and characteristics that may influence risky driving and, in turn, driving under the influence. Donovan, Marlatt and Salzberg (1983) summarized the literature of the time, finding several characteristics that were consistently associated with high risk driving behavior, with or without the presence of an associated alcohol problem. The characteristics were condensed into four categories: 1) emotional lability, 2) impulsiveness and thrill seeking, 3) overt and covert expressions of anger and hostility, and 4) feelings of depression and low levels of perceived personal control.

In a later study, Donovan, Umlauf and Salzberg (1988) postulated that the influence of these characteristics can be manifested in driving related attitudes and behaviors including driving as a means of reducing psychological distress, increasing the perception of personal control, expressing acute or chronic anger, and seeking thrills and excitement. Donovan et al. emphasized that alcohol and this constellation of personality and attitudinal factors each appears to contribute to the risk-enhancement process independently, but their influence is increased interactively when both occur concurrently in the same person.

In a study of 193 male subjects who had four traffic violations or accidents in one year or five in two years, the authors identified three clusters of variables that described risky driving behavior. Each of the three clusters was associated with a specific theory of risky driving. Forty-nine percent of the subjects manifested Cluster 1 variables. They had the lowest overall level of potentially risk-enhancing characteristics including levels of personality function and hostility that were comparable or less than that of the general male driving population in the state. They were the oldest, most socially stable, most likely to be married, and showed the lowest levels of drinking. Donovan et al. concluded that the subjects in Cluster 1 demonstrated risky driving behaviors that were independent of their personality function and that these individuals, in spite of their risky driving behavior or driving incidents, were relatively well off. Cluster 2 subjects displayed a high degree of impulsivity, sensation-seeking, competitive speeding, overt expressions of anger and external perception of control. This group was consistent with the principles of Problem-Behavior Theory, displaying a lifestyle characterized by multiple problem behaviors and higher levels of risk-taking. It is also consistent with the principles of social maladjustment and impulse control deficit theories of risky driving which views poor driving as one part of a pattern of irresponsible behavior and the inability to control one's impulses while driving. Finally, subjects in Cluster 3 displayed high levels of emotional sensitivity, irritability, resentment, dysphoria and a belief that they are not in control of many important aspects of their lives. They had the poorest coping skills and had the greatest likelihood of driving as a means of coping with stress, anxiety and frustration. These subjects seemed to fit the personal maladjustment theory which views bad drivers as individuals experiencing personal stress or going through difficult times in their lives.

Donovan et al.'s overall conclusions are that a combination of driving related attitudes, psychosocial function, general coping strategies, and drinking behavior, taken together, would provide a better basis than driving record alone, for classifying high risk drivers. They feel that education and treatment programs that focus on the driving behavior alone, instead of including such factors as impulsive behavioral style, depression, emotional distress and drinking behavior, will have limited success reducing the targeted behavior. In addition, they refuted findings from other studies by showing that drinking behavior among high risk drivers can predict incidences of driving while impaired and first time DUI offenses.

Another study on the application of Problem-Behavior Theory to risky driving and driving under the influence was done by Wilson and Jonah (1988). After testing a DUI group, high risk driving group, and a control group and using advanced statistical techniques including factor analysis, canonical correlations and stepwise multiple regression analysis, they found that risky driving is part of a problem behavior syndrome and is influenced by the personality and perceived environment systems. Variables in the behavioral system were found to account for 19% of the variance in risky driving while the personality system variables accounted for 12% of the variance with thrill seeking a' the major predictor. The perceived environment system accounted for only 9% of the variance and was determined to be the least useful system in the prediction of risky driving in adults because it consists of a number of factors related to parental influence and controls and these may not have a strong influence after one moves away for the parent's home. This contrasted with Jessor's (1987) findings that the personality system was the weakest predictor of risky driving. In addition, Wilson et al. found that the thrill-seeking variable was important in all three samples and depression contributed to the prediction of risk only in the DUI group.

Additional significant research on risky driving and DUI was conducted by Wilson (1991). In this study, she found that DUI offenders and other problem drivers share many similar characteristics on personality, attitudinal and behavioral dimensions including elevated levels of impulsiveness, sensation-seeking, and hostility; aggressive and competitive driving related attitudes; tobacco and drug use; and higher incidences of personal problems. She concludes that DUI offenders and high risk drivers may actually respond to similar educational or treatment techniques because DUI offenders are not a unique subgroup of high risk drivers, but rather, share many of the same characteristics.

Her analysis identified three factors that accounted for 45% of the variance in the study group. The first factor, accounting for 17% of the variance, included the concepts of sensation-seeking, impulsiveness and lack of responsible values. The second factor, accounting for 15% of the variance, includes aggression/hostility, with sensation-seeking and impulse expression moderately related. The third factor, accounting for 13% of the variance, represented depression and personal adjustment. Using these factors, Wilson then identified four subtypes within the DUI/high risk sample, including well-adjusted (46.4 %) with the lowest levels of hostility and sensation-seeking and the highest value on responsibility; deviant (12.5%), with high levels of hostility, impulsiveness, and sensation-seeking and a low value on responsibility; irresponsible with low depression, few personal problems, moderate parental compatibility, and high hostility, thrill-seeking and irresponsible values; and hostile/responsible, with high value on responsibility, low sensation-seeking, impulsiveness and drug use, and high hostility. Like Donovan et al. (1988), Wilson identified a large group of rather well-adjusted individuals in the sample who, nonetheless, had committed a DUI offense or some other driving offense. The implication is that these individuals may be responsive to an educationally-oriented short term program rather than more intensive treatment. In addition, she recommends treatment of depression and substance abuse and acquisition of coping skills for some individuals.

The most recent study by Wilson (1992) replicated some of Donovan's (1983) earlier findings related to the characteristics of DUI offenders and high risk drivers. She found that DUI offenders were the heaviest and most frequent drinkers among high risk drivers and controls and both the DUI offenders and high risk drivers showed higher levels of sensation-seeking than the controls. By controlling for age and education level, however, she found discrepancies in Donovan's findings. She concluded that DUI offenders and high risk drivers were not necessarily subsets of a larger population of high risk drivers, but that DUI offenders "...were consistently more deviant on behavioral and personality measures than were the high-risk group, indicating that DWIs are not simply high-risk drivers who happen to drink heavily" (Wilson, 1992, p. 343). Because age was shown to covary strongly with risky driving, sensation-seeking, hostility, personal upheaval, and drug and alcohol abuse, she concluded that it is possible to identify homogeneous groups of problem drivers including DUI offenders, and apply differential levels of intervention appropriate to the individual.

Several other studies have highlighted the association between DUI offenses, risky driving and Problem-Behavior Theory contending that DUI offenders are members of a larger group of risky drivers who demonstrate a cluster of negative behaviors in addition to driving under the influence. Swisher (1988) applied Problem-Behavior Theory to risky driving and riding practices in adolescents and found that these practices appear to be part of a larger cluster of negative behaviors. The study is important because it shows a relationship between a wide variety of negative behaviors and risky driving behaviors including driving under the influence.

Jonah and Dawson (1987) examined the relationship between age and risky driving, risk perception and risk utility and found strong support for the contention that young drivers are more likely than older drivers to engage in risk taking behavior while driving. Sexton (1988), in contrast, found that increased years of driving experience correlated with higher risk-taking and that education was a significant predictor of negative risk-taking. Finally, Yu and Williford (1993) completed a LISREL analysis of data collected on 878 respondents in alcohol treatment and criminal justice facilities and found that high-risk driving associates with risk/sensation-seeking attitudes. "A person who is high risk/sensation-seeking in general tends to drive at high risk in particular" (p. 79).

Conclusions from Previous Research

The literature review on the characteristics of DUI offenders shows a rich pool of previous research that moves in the direction of identifying characteristics of first time and repeat DUI offenders and using this information to address the DUI problem. The impetus for much of the research grew from the concern that many individuals are completing DUI treatment or education programs and continuing to commit subsequent offenses.

Many researchers, including McMillen et al. (1992), Wilson (1992), McMillen et al. (1991), Wilson (1991), Johnson et al. (1989), Donovan et al. (1988), Swisher (1988), Wilson et al. (1988), Jessor (1987) and Jonah et al. (1987), concur with the Problem-Behavior Theory concept that DUI behavior occurs in individuals who display a cluster of problem behaviors, rather than one problem, such as alcoholism. Differences of opinion exist about the specific cluster of problems or characteristics that best fits the DUI offender. Perhaps the most realistic conclusion is Donovan et al's. (1988) finding that DUI offenders display a cluster of behaviors but there are different subtypes with different clusters of behaviors. One of the subtypes, in fact, consists of individuals who are relatively well adjusted. This allows an appropriate explanation for those DUI offenders who truly did display an isolated case of poor judgment and are not, in fact, maladjusted. It seems, however, that the majority of DUI offenders fit one of the other maladjusted subtypes.

The issue about the specific characteristics that describe DUI offenders or that differentiates first time offenders from recidivists continues to be debated. Most researchers agree that recidivists, and possibly first time offenders as well, display a problem with alcohol. The issue seems to be to identify the other characteristics that, in conjunction with this alcohol problem, result in DUI behavior. While many researchers cited the importance of sensation-seeking and impulsivity, others disagreed that these were important variables. Likewise, depression was found to be a significant factor in a number of studies, but was discounted in others.

Finally, the methodology used in some studies limited the generalizability of the findings. Courtney (1988) presented a very useful study, but used patients in an alcohol treatment program as subjects rather than non-institutionalized subjects. This effectively eliminated the "well adjusted" subtype discussed by Donovan et al. (1988). Another study (Myatt, 1990) nicely examined differences between first time offenders, recidivists, and non-DUI alcoholics but used a total sample of 60, with only 20 respondents in each group, thus bringing into question the accuracy and replicability of the results.

To conclude, recent research has addressed the DUI offender as a unique individual, either in a group with other risky drivers , or in a separate category. The uniqueness is characterized by a cluster of negative behaviors or characteristics that, together with an alcohol problem, results in the increased likelihood of DUI behavior. The search for the components of this cluster of behaviors or characteristics continues and is the focal point of this research study. In particular, it is proposed that repeat DUI offenders possess a unique cluster of behaviors or characteristics that sets them apart from first time offenders or non-DUI alcoholics. This study differs from previous research because it attempts to identify those unique characteristics in a large sample (N=296) that will be selected from a population that is fully representative of DUI offenders, as well as non-DUI alcoholics in the geographic area selected.

Chapter 3

Research Plan and Predictions

Study Variables

The specific behaviors or characteristics that will be studied include alcoholism, a self-reported measure of driving under the influence (but not caught), depression, hopelessness, anger, acting out, anxiety, paranoia, psychopathy, obsessive-compulsiveness, sensation-seeking, and impulsivity. In addition, a number of demographic variables, including age, education, marital status and race, will be measured.

The measure of alcoholism is basic to the study to rule out the simple and often incorrectly assumed notion that only alcoholics drive under the influence. A self-reported measure of driving under the influence but not caught will provide data to test whether a DUI offense is purely a chance factor or whether individuals who drive under the influence regardless of whether they were caught, present with certain characteristics or problem behaviors. The number of driving violations, accidents, driver's license and insurance status provide an operationalized measure of rebellious or non-conforming driving behavior that typifies components in Jessor's behavior system. Depression, hopelessness, anger, acting out and anxiety are psychological conditions the individual experiences that may affect their behavior. These conditions were selected for the study because they are known to be associated with use of alcohol for coping purposes or are the resultant condition after use of alcohol for other purposes. Paranoia, psychopathy and obsessive-compulsiveness are personality characteristics that have the potential to maladaptively influence an individual's behavior. The paranoid individual may feel threatened or suspicious of others who offer to drive him or her home after drinking. The person with peculiar, psychopathy like characteristics has an unusual slant on their perception of life in general and likewise is apt to respond differently in a potential drink driving situation. In a similar manner, the obsessive-compulsive individual may become narrowly focused on driving home regardless of the intoxicated condition.

Finally, sensation-seeking and impulsivity are additional personality characteristics that may influence an individual's behavior after drinking. Sensation-seeking theory has a psychophysiological basis, pointing to an interaction between environmental stimulation and characteristics of the central nervous system. It addresses differences in optimal levels of stimulation and arousal in individuals (Zuckerman, 1979). While sensation-seeking behavior may be focused on appropriate and legal, although nonetheless risky, activities such as bungie jumping, a number of researchers have found high sensation-seeking behavior in DUI offenders (McMillen et al., 1992; Stacy et al., 1991; Little et al., 1989; & Wilson, 1992). Some of the same studies (McMillen et al. & Wilson, 1992) also found high levels of impulsive behavior in DUI offenders. Commercial ad campaigns urging individuals to "Think before you drink and drive" are aimed at this type of impulsive behavior. Additionally, the reduced levels of inhibition experienced by many drinkers may compound this impulsivity.

In order to enhance reliability and possibly validity, these measures will be grouped into composite scores through a factor analysis procedure to eliminate collinearity and to develop constructs that represent groupings of the variables.

Hypotheses

The following hypotheses will be addressed in light of the above background review and proposed study plan:

H_1: Non-DUI alcoholics and recidivists will score higher on measures of alcoholism than first time offenders. Non-DUI alcoholics will score the highest.

While it is somewhat logical to assume that alcoholics and recidivists will score higher on measures of alcoholism than first time offenders, the hypothesis must be tested to ensure its accuracy. If confirmed, this will tend to support the commonly held belief that anyone who commits repeat DUI offenses must surely have a serious problem with alcohol (Jacobs, 1990). The answer to this question is fundamental when determining the type of treatment recidivists should receive. If a large percentage of recidivists are alcoholic, the treatment should have a significant alcohol rehabilitation component. If, however, results show that many recidivists are not alcoholic, the treatment should be tailored to the specific problem behaviors that contribute to the repeat DUI offenses. In the case of first time offenders, if there is less of an alcohol problem, treatment may need to focus on the other problem behaviors in order to be effective. This is not to say alcohol treatment should be eliminated from DUI programs. Rather, the findings may show that treatment could be more effective if it addresses other problem behaviors in addition to alcohol issues. Part of the purpose of the study is to determine whether or not recidivists and first time offenders have the same type of problem with alcohol as alcoholics or if there are other factors that influence their behavior. The study will explore some of these other factors.

The first hypothesis also indicates the expectation that non-DUI alcoholics will score higher on measures of alcoholism than first time offenders. This result is expected not only because the non-DUI alcoholics are, in fact, identified as alcoholics, but it is presumed that a portion of the sample of first time offenders will be comprised of individuals who do not have an alcohol problem, but, rather, exercised poor judgment by driving after drinking. A 1983 study (Vingilis) found that alcoholics as a group are high risk drivers and are thus highly represented in DUI statistics, but only 30 - 50% of drinking drivers are alcoholic. In addition, the excessive and sporadic use of alcohol among college students suggests that nonalcoholics contribute substantially to the population of DUI offenders (Geller & Lehman, 1988). In both cases, the first time offenders as a whole would be expected to score lower on measures of alcoholism than the other two groups.

The DUI offense represents a problem behavior that occurs as a result of misuse of alcohol - an action represented by Jessor's behavior system (1987). The first hypothesis addresses the misuse of alcohol as one of a cluster of variables that contributes to the problem behavior - the DUI offense. In this regard, the misuse of alcohol in the behavior system interacts with other variables in the behavior system as well as the perceived environment and personality systems to result in the problem behavior identified as the DUI offense.

H_2: Recidivists and non-DUI alcoholics will score higher on measures of psychopathology than first time offenders. Recidivists will score the highest on these measures.

As discussed above, the assumptions made by Jessor (1987), Donovan et al. (1988), McMillen et al. (1992), Wilson (1992) and others support the Problem-Behavior Theory concept that problem behavior, including driving under the influence, is the result of an interaction of the personality, behavioral and perceived environment systems. Since research has shown that variables in the perceived environment system are least effective in predicting DUI problem behavior (they account for an insignificant amount of the variance in driving under the influence) (Wilson et al., 1988), this study will focus only on variables in the behavior and personality systems. A number of psychological variables in the personality system interact to contribute to the problem behavior. To test the second hypothesis the variables in the personality system that will be measured include depression, hopelessness, anxiety, obsessive-compulsiveness, paranoia and psychopathy. While this hypothesis will examine differences between all three groups, it will focus on differences between first time offenders and recidivists to determine whether we can factor out first time offenders who are likely to not repeat the DUI behavior as opposed to those who are likely to become recidivists. Also, differences between recidivists and non-DUI alcoholics will be examined to address whether or not these two groups represent one and the same population. If the test shows there are significant differences between the three groups, it would be useful to know the specific variables that differentiate the groups. A rank order of the more important variables would also be useful so that treatment can focus on the more pertinent issues that contribute to the DUI behavior.

The association between depression and alcoholism is well documented in the literature (Watson, 1989; Bedi & Halikas; Brown, 1985 & Milt, 1976). If it is assumed that a significant percentage of DUI offenders (especially recidivists) are alcoholics, and a number of alcoholics experience depressive symptomology, we can also assume that a certain percentage of DUI offenders are depressed. This, in fact, has been shown in previous studies (Wilson, 1991 & Windle et al., 1989). By testing for depression on two different continuous depression scales, the Beck Depression Inventory and the Symptom Checklist 90 - Revised, the existence of depressive symptomology as well as the level of the symptomology can be determined. Through additional statistical analysis that will be discussed later, the relative importance of any detected depressive symptoms can be determined.

Hopelessness is a condition often associated with depression and suicidal ideation. The high mortality rate among drunk drivers justifies measurement of this variable. While little direct evidence of hopelessness or suicidal ideation in DUI offenders appears in past research, the connection between the DUI behavior, alcoholism, depression, and fatal accidents cannot be ignored. In 1991 the percentage of fatally injured drivers between the ages of 21 and 44 who had blood alcohol concentrations above .10 is substantial. The rates are 48.2% for ages 21 to 24, 52.5% for ages 25 to 34, and 44.8% for ages 35 to 44 (FARS, 1993). The possibility that depression or suicidal ideation could be enhanced through the excessive use of alcohol exists. It is therefore hypothesized that higher levels of hopelessness will be seen in DUI recidivists and non-DUI alcoholics than in first time offenders.

Most individuals experience anxiety as a normal defense mechanism during stressful situations. Abnormal cases of anxiety, however, can be manifested as various anxiety disorders such as phobic disorders, panic attacks, generalized anxiety disorder and obsessive-compulsive disorders. In alcoholics, withdrawal anxiety is often treated through self-medication via alcohol intake and thus, the psychological and physiological process of addiction occurs. Because self-medicating with alcohol often successfully subdues withdrawal anxiety, alcoholics not uncommonly generalize and begin to treat all anxiety with alcohol (Geller, 1983). It is appropriate, therefore, to examine anxiety as well as obsessive-compulsive disorders, which result in increased levels of anxiety, to determine whether they play a significant role in DUI behavior.

Finally, the notion that other psychiatric problems such as paranoia or more severe psychiatric symptomology plays a role in DUI behavior has been explored in previous studies (Sutton, 1993; McMillan et al., 1992; & Johnson et al., 1989). Sutton (1993) noted that 38% of impaired drivers showed signs of clinical psychiatric symptoms and that the possibility exists that these offenders may have attempted to self-medicate these emotional symptoms with alcohol. McMillan et al. (1992) not only found that a significant number of DUI offenders showed poor emotional adjustment, but that there was significantly more poor emotional adjustment among DUI recidivists than among first time offenders. Johnson et al. identified paranoid ideation, anxiety and decreased levels of self-esteem as factors contributing to DUI behavior. In a study on alcoholism, Shaefer, et al. (1987) established correlations between severity of alcoholism and elevations on the Obsessive-Compulsive, Interpersonal Sensitivity, Hostility, Paranoid Ideation and Psychotocism scales of the Symptom Checklist - 90 - Revised test. The number of alcoholics in this study who had committed DUI offenses, however, is not known. The hypothesis will test the plausibility that these psychiatric symptoms contribute to repeat DUI behavior as is suggested by past research.

Taken collectively, these psychological variables constitute problems in Jessor's personality system. According to Problem-Behavior Theory, as other problem behaviors such as these in the personality system increase, the likelihood of a problem behavior such as drunk driving increases. The hypothesis, then, is that DUI recidivists and non-DUI alcoholics will score higher on measures of psychopathology than first time DUI offenders. It follows that recidivists will score highest on these measures because they not only are likely to present with an alcohol problem, but they have further demonstrated an additional problem behavior by committing a drunk driving offense. Non-DUI alcoholics, on the other hand, display substantial problems managing alcohol but have at least been able to control getting caught in a DUI situation, thus eliminating this one problem from their cluster of problem behaviors.

H_3: Recidivists will show the highest levels of impulsivity, sensation-seeking and anti-social behavior among the three groups. Non-DUI alcoholics will show the lowest levels of these variables.

While alcoholism and varying levels of personal and psychiatric problems may explain some of the differences between levels of DUI behavior, these variables alone would not be expected to maximize the explanation of the differences. However, alcoholism and psychiatric problems in conjunction with high levels of impulsivity, sensation-seeking behavior or anti-social behavior is more likely to explain the differences between levels of DUI offenders. Johnson et al. (1989) found that risk-taking, impulsivity, sensation-seeking, aggression and hostility as well as other psychosocial problems contributed to DUI behavior and that youths with these characteristics were more likely to use alcohol or drugs to cope with personal problems and then to drive impaired. Johnson et al's. findings, that multiple deviant behaviors contribute to the problem DUI behavior is consistent with Jessor's Problem Behavior Theory. Wilson (1992) supported these findings by showing that DUI offenders display significant levels of sensation-seeking, impulsiveness, aggression, hostility, depression and personal adjustment difficulties as well as showing a lower level of responsible values. The last hypothesis will test the impact of sensation-seeking, impulsivity and acting out behavior on DUI behavior with the expectation that these variables will be more evident in recidivists than first time offenders or non-DUI alcoholics. Because these variables may contribute to any DUI offense, the levels of these variables would be expected to be higher in first time offenders than in non-DUI alcoholics.

Exploratory Research Questions

After studying the above hypotheses it is appropriate to explore a method to differentiate DUI offenders into two risk levels - high risk and low risk offenders. By observing the characteristics of a known sample of first time offenders and recidivists, we may be able to develop a predictive model to assign group membership with a reasonable degree of certainty. We can carry the exploration further by including the non-DUI alcoholics as an additional group. Differentiating among the groups allows us to observe any differences between assigned group and predicted group in new members, thus identifying individuals who are high risk to repeat the DUI offense.

We can also benefit from knowing which particular variables are most powerful in helping differentiate among the groups. Knowing the contribution of these variables to the DUI behavior allows agencies to improve on their treatment and prevention programs by including treatment or information that addresses the specific variables.

Another perspective, the issue of the legal definition of a DUI offense, was discussed earlier. While an individual could be judged a first time offender, they might more appropriately be labeled a "first time caught" offender because they may actually have driven under the influence many times in the past without being caught. The willingness to drive under the influence of alcohol is an interesting topic for study. Knowledge of the characteristics of individuals who frequently drive under the influence, whether or not they are caught, may be useful in understanding the characteristics of all DUI offenders.

Finally, it would be interesting to examine whether the currently used DUI evaluation instrument in Pennsylvania, the Mortimer-Filkins test, is effective identifying high risk DUI offenders. Test results are weighed heavily when determining the level of intervention for DUI offenders. One criteria of the effectiveness of treatment, then, depends somewhat on offenders being placed properly. It would be interesting to know whether high Mortimer-Filkins scores correspond with other measures that are associated with recidivists through this study.

The final exploratory component of the study then, will consist of an examination of the Mortimer-Filkins score of DUI first offenders who present with a test profile similar to that of recidivists. These first time offenders would be considered high risk to repeat the DUI offense. It would, therefore, be useful to place them in the most intense level of rehabilitation. If, however, the Mortimer-Filkins score is low, it is likely they would be placed in a lower level of rehabilitation, thus possibly failing to intercept their tendency to repeat the DUI offense. As discussed in the initial rationale for this study, many DUI treatment programs focus treatment and education efforts on alcoholism. While it is widely accepted that alcohol plays a significant role in the DUI offender's lifestyle, it may not be the only variable that contributes to the DUI behavior. In this regard, the Mortimer-Filkins test, which focuses heavily on alcohol and drug use, may not be fully suited to determine the needed treatment.

In addition to the study hypotheses, then, the following exploratory research questions will be addressed:

1) Can we differentiate first time DUI offenders into high and low risk groups by observing the characteristics of a sample of first time offenders, recidivists, and non-DUI alcoholics? If so, can we apply the same process to identify first time offenders who may be high risk to repeat the DUI offense at some point in the future?

2) Within the purview of the study variables, can we identify those variables that contribute most accurately to the assignment of group membership?

3) What characteristics are associated with individuals who frequently drive under the influence, regardless of whether they are caught?

4) Do Mortimer-Filkins test scores correspond with other measures associated with high risk offenders that are identified in this study?

Chapter 4

Method

Study Design

The design methodology is similar to that of a one shot case study. The dependent variable, level of DUI, is actually a measure of a behavior that has already occurred. Respondents were grouped according to the number of DUI's they have committed (none, one or many). The hypotheses proposed that the level of DUI depends on the level of the independent variables, including alcohol use, personality characteristics, psychopathology, and sensation-seeking behavior. These independent variables were measured at one point in time, yielding a unique measure of each of the three groups. Assuming that the sample was of sufficient size and representative of the general population, it may be possible to differentiate membership in one of the two DUI groups by testing subsequent respondents and comparing the response profile with those in the study.

Respondents

The respondents for the study were selected from male individuals who were participating in Track 1 of the DUI programs at two DUI treatment and education facilities in the Pittsburgh area. Track 1 is the educational component of the DUI program and participation is required of all DUI offenders, regardless of the number of offenses or severity of the problem. Testing respondents during Track 1 ensures that they have not been influenced by treatment that may occur during latter stages of the program. Both agencies divide participants into two groups: first time offenders and recidivists, and provide Track 1 classes for each group separately. In order to ensure a research study with sufficient statistical power, a sample of 50-60 first time offenders and 50-60 recidivists from each of two agencies will be tested for a total experimental sample of 200-240 respondents. The amount of time needed to gather the data will depend on the volume of DUI offenders using each program and the convenience of the staff schedules to accommodate the testing. To maintain a random sample, efforts were made to test groups from all the times and days of the week that the Track 1 program is offered at each agency. Unless respondents refuse to participate in the study, all members of a given Track 1 group will be tested. Data on females who are tested will be analyzed in a separate study.

The comparison group will consist of 50-60 male individuals from the outpatient alcohol treatment program at two agencies, who have an identified alcohol problem and have not had a DUI conviction. These respondents were tested during their initial intake interview or before the third counseling session to minimize any influence from the program.

Agencies

The study was conducted at two DUI and alcohol treatment agencies in the greater Pittsburgh, Pennsylvania area. Both agencies fully agreed to participate in the study and provided working space and staff consultation and assistance to gather the data. The first agency, located in the urban south side of Pittsburgh, is one of four branches of a large DUI program serving the Pittsburgh area. This program, which will be referred to as Agency A, provides a full range of chemical abuse treatment and education including programs for DUI offenders. Agency A is staffed by five professionals in the DUI program and six professionals in the chemical treatment program in addition to supervisory personnel. The area served includes the urban and suburban south side of Pittsburgh. The population is bi-racial and is mixed regarding employment levels and socioeconomic status, but favoring the working class as the majority. There is a rather high rate of unemployment.

Agency B is located in a rebuilding steel mill river town near Pittsburgh. There is an extremely high unemployment rate in the community. The population is bi-racial, consisting mostly of working and lower class residents. In the past ten years, the relocation of most of the steel industry from the area has caused considerable socioeconomic hardship and adjustment. Agency B operates the local DUI project which provides education and treatment for DUI offenders, including Tracks 1, 2 and 3. It employs a staff of three professionals and three paraprofessionals in the DUI project. Agency B also provides a full range of chemical abuse services and employs eight additional full time professionals.

Taken together, Agencies A and B provide a potential pool for a diverse mixture of respondents in regards to age, race, socio-economic status and education. The DUI population that these two agencies serve is a mixture of urban and suburban, rich and poor, employed and unemployed, and with varying educational backgrounds.

Procedure

A start date for data collection in the DUI programs was established with both agencies, and a schedule of the DUI classes was reviewed to determine feasibility of testing. The goal was to maintain randomness by offering testing to all classes beginning with the start date. This was successfully accomplished with one exception due to a scheduling conflict. In addition, it was decided that the Wednesday evening class at Agency A was too large to test without substantial inconvenience to staff and clients and was therefore dropped as a potential source of respondents. With these two exceptions, testing began on the start date and continued until the desired N was obtained. The sample, therefore, consisted of the population of willing first time and repeat DUI offenders that participated in Track 1 classes during the testing period. The procedure for the comparison group was slightly different and will be discussed below.

The nature of the study was briefly reviewed by the agency staff member during each potential subject's initial intake interview. This allowed the respondents to consider whether they wished to participate or decline. At the end of each Track 1 class the test administrator was introduced and explained the study purpose to the group. Throughout the study administration process attempts were made to minimize respondent reactivity to participating in a research study by assuring respondents of full and complete confidentiality and that the researcher was a University of Pittsburgh student and not affiliated in any way with the agencies. It was also guaranteed that information gained through the testing would not be used by the agencies in the DUI treatment or education program. Potential respondents were informed that participation was purely voluntary and that all information would be held in the strictest confidence in accordance with sound ethical practice. They were also informed that the results of the study would not affect their status in the DUI program in any way.

After the nature of the study was explained, each potential subject was given a Consent Form to read and, if agreeable, to sign. (Copies of the Consent Form and Comprehensive Answer Sheet are in the Appendix). It was explained that some of the scales measured psychosocial characteristics and the experimenter was obligated to report any response elevations to the subject. Elevations would not affect the subject's status in the program and any action taken as a result of the elevations was purely the subject's choice.

Respondents who agreed to participate in the study were then given a Comprehensive Answer Sheet and asked to write their name on the removable label at the top. This would allow identification if there were elevated scores. It was felt that there was an ethical and professional obligation to inform respondents of potentially dangerous elevations on the test scales. Otherwise, the label would be discarded and a non-identifiable number would be assigned for study purposes. Respondents were then asked to complete the demographics section at the top of the answer sheet.

The test packets were then distributed and respondents were instructed to read instructions at the beginning of each section. They were told that they may be "on the fence" after reading many questions, not sure which way to respond, but they should decide which answer *best* fit their feelings even though it didn't *always* fit. They were encouraged to answer all items by indicating their response on the Comprehensive Answer Sheet. They were also told there was no time limit for the questionnaire, but they should answer the items in a straightforward manner rather than deliberating over the items. The average amount of time needed for completion was approximately 25-30 minutes.

Respondents were informed that they would be asked to interrupt their testing one at a time and step into the adjacent room for a separate part of the procedure. At this time respondents were asked a brief set of questions by the interviewer. In the study design it was felt that more accurate responses would be obtained by asking these questions through an interviewer rather than allowing the respondents to read and interpret the questions in the test packet. This set of questions includes the information about number of times the subject drove under the influence without being caught. Finally, respondents were asked to complete the Trailmaking test, parts A and B. Results of this test would be used for another study on this data set. After completion of this set of questions, the respondents returned to the testing room to finish the self-administered questionnaire. They were dismissed upon completion.

After the instrument was scored letters were prepared for any respondents who had significant elevations on the depression scales or overall psychological profile. The letter indicated that there were some elevations on the test profile that the respondent may or may not be aware of and they may be interested in discussing these elevations with a counselor. If the respondent did not request additional clarification or a copy of the test results within two weeks, the removable name label was discarded to maintain confidentiality. In cases where there were no elevations, the removable name label was discarded immediately and the data was prepared for analysis.

The entire procedure, including the test battery and Comprehensive Answer Sheet, was pretested with a group of 28 individuals in a DUI program. After minor adjustments, the package was found to be suitable for use.

Instrumentation Overview

This is a multi-faceted instrument that consists of measures of alcoholism, psychopathology, personality characteristics and sensation-seeking. The test battery will consist of the following existing scales or portions of scales:

- MacAndrews Alcoholism Scale from the MMPI
- Michigan Alcoholism Screening Test
- Beck Depression Inventory
- Beck Hopelessness Scale
- The following scales from the Symptom Checklist 90-R: Obessesive-Compulsive; Depression; Anxiety; Paranoia; and Psychopathy.

The following scales from the Drug Use Screening Inventory: Behavior Pattern Domain and Psychiatric Disorder Domain.

The following scales from the Zuckerman-Kuhlman Personality Questionnaire: Impulsivity and Sensation Seeking.

Since several of these scales measure similar constructs, they will be grouped into factor scores through a factor analysis procedure that will be discussed later. This will result in composite scores that represent constructs which can be used by agencies as a guide to develop programming.

In addition, respondents will be asked to complete a brief demographics section and answer questions about their drinking and driving histories. This section was developed exclusively for the study. Finally, as part of the Consent Form, respondents agreed to release the results of the Mortimer-Filkins test that was completed by the county DUI program and the Pennsylvania Department of Transportation. Only the two or three digit number representing the final score was released.

The specific battery was selected for a number of reasons. First and foremost, it accurately provides a useful measure of the desired variables. Validity and reliability information is discussed below and shows that the measures are accurate and consistent. Second, the battery is mostly self-administered, resulting in a minimal time demand on the test administrator. Third, the battery can be completed in a short period of time, usually not exceeding 35 minutes. Finally, the battery is relatively easy to score by hand, requiring approximately 4-5 minutes for each respondent, with practice. This combination allows a large sample to be selected with a reasonable expenditure of time and resources by both the respondents and the researcher. A description of the demographics section and each scale from the test battery follows.

Comprehensive Answer Sheet and Demographical Information

A Comprehensive Answer Sheet is used to record each respondents' scores to the test battery. At the top of the Comprehensive Answer Sheet a number of demographics questions are completed by the subject. These include age, sex, marital status, race, income and education level. In addition, the following questions about drinking and driving are included: breath alcohol content at the time of the DUI; number of DUI offenses; number of years driving; number of traffic tickets received (moving violations); number of accidents - regardless of fault; and, at the time of the DUI, did the subject have insurance and a valid driver's license. These questions are designed to obtain a measure of the offender's deviant behavior that is related to drinking and driving. Finally, the interviewer administered section asks information about the number of times the subject drove under the influence but was not caught. The question yielded a subjective measure of driving under the influence in the past 12 months. Driving under the influence was operationalized as driving after having four or more drinks within two hours for persons weighing up to 130 pounds; five or more drinks within two hours for persons weighing up to 160 pounds; six or more drinks within two hours for persons weighing up to 220 pounds and eight or more drinks within two hours for persons weighing over 220 pounds. Respondents were asked to provide their best estimate by considering the number of times they drove under the influence per week or month and then an annual rate was computed.

Measures of Alcohol Use

MacAndrew Alcoholism Scale

The MacAndrew Alcoholism Scale is a widely used 51 item subscale of the MMPI that is designed to provide a measure of the alcoholic or addictive personality. Like the MMPI, it uses a forced choice, true - false format and questions are highly disguised regarding their intended purpose. Examples of some of the items include: "I like to read newspapers"; "I have not lived the right kind of life"; I like to cook"; "I seem to make friends about as quickly as others do"; and "I deserve severe punishment for my sins." Using the cutoff score of 24 or greater, a number of studies have verified its ability to discriminate between alcoholics or drug users and non-alcoholic psychiatric patients (Lachar, Berman, Grisell & Schoof, 1976; MacAndrew; Schwartz & Graham, 1979; MacAndrew, 1981; and Knowles & Schroeder, 1990). While MacAndrew clarifies that the scale is not intended to act as an all purpose alcoholism scale which would differentiate alcoholics from non-alcoholics (1981), he states that the scale taps a fundamental bipolar dimension of character; that this character orientation is present in approximately 85% of the members of diverse samples of alcoholics; that the character orientation is also present in approximately 85% of drug misusers; and that the character orientation predates the onset of the alcoholism or drug misuse thereby ruling out a reactive character disorder due to the alcohol or drug misuse. Results of cross-validation studies by MacAndrew and over a dozen other researchers verify that alcoholics are not just neurotics who happen to drink too much, but that they present a distinct character that can be identified through the scale. MacAndrew (1981) summarized 16 cross-validation studies that reported an average detection rate of 86.3%, ± 4.8%, for 1220 alcoholics, indicating "...no validity shrinkage whatsoever on cross-validation" (p. 609). In a more recent review of studies on the scale, Knowles and Schroeder (1990) reported that the scale may be identifying enduring personality characteristics that are present in alcoholics or potential alcoholics. They summarized research reporting that MacAndrews scores appear to be independent of age, chronicity, psychotherapeutic intervention, drinking behavior before and after the onset of alcoholism, family history of alcoholism, and type of alcoholism (essential or reactive). They conclude that the MAC is measuring stable dispositional characteristics rather than personality traits that develop only as a consequence of dysfunctional drinking. In addition, their results, using the mixed-group validation procedure produced validity coefficients that were comparable to the concurrent validity coefficients that MacAndrew obtained using traditional criterion group procedures.

Schwartz and Graham (1979) examined the MacAndrews Scale to test whether it provided a true measure of alcoholism, or if it actually provided a measure of antisociality or acting out behaviors. They cited studies supporting both these possibilities. Completing a factor analysis on the scale, they identified six factors including, cognitive impairment, school maladjustment, interpersonal competence, risk taking, extroversion and exhibitionism, and moral indignation. They found no evidence that the MAC measures a general dimension of antisociality. By examining the intercorrelations between the MAC and other MMPI scales, they found the MAC associated with two clusters of personality characteristics. The first cluster is related to a shallow, impulsively aggressive or hostile interpersonal stance characterized by a high level of energy expenditure. The second cluster is related to general psychological maladjustment and problems with thinking, concentration, and possibly perception. The authors are quick to caution that a rather small number of items loaded on several of the factors, including three items on the extroversion and exhibition factor and five items each on the school maladjustment, risk taking, and moral indignation factors. In summary, the factor analysis showed that the MAC identifies impulsivity, high energy levels, interpersonal shallowness, and general psychological maladjustment. It does not, however, appear to identify a general dimension of antisociality.

Scoring the MacAndrews consists of counting the number of true or false responses that are answered in the alcoholic direction according to the answer code. Scores greater than 23 are considered significant (MacAndrew, 1981).

Michigan Alcoholism Screening Test

The Michigan Alcoholism Screening Test (MAST) is perhaps the most widely used short measure of alcoholism. It is a self-administered, 25 item yes-no measure with high "face validity", indicating that the subject can easily discern that the test is measuring various drinking behaviors. Although the transparency of the MAST has come under question because of the known tendency of alcoholics to minimize their symptoms, Selzer (1967) contends that by using the appropriate cut-off scores (discussed below) there are sufficient items for most alcoholics to eventually betray themselves. In another study, Ehrlich and Selzer (1967) noted that 92% of alcoholics (N=99) were identified as alcoholics on the MAST even when they were directed to intentionally lie about their drinking.

The MAST assesses medical, interpersonal and legal problems associated with alcohol abuse. Examples of the items include, "Do you feel you are a normal drinker?", "Do you ever feel bad about your drinking?", "Has your wife (or other family member) ever gone to anyone for help about your drinking?", "Have you ever been in a hospital because of drinking?" and "Have you ever been arrested for drunk driving after drinking?". Most items, when answered in the alcoholic direction are scored two points. Four items are scored one point, three items are scored five points and one item is scored zero points. Responses on items 1, 4, 6 and 8 are reversed thus limiting the respondents' tendency to answer false to all the items.

The scoring guide indicates that a score of three or less points is indicative of a non-alcoholic, a score of four points is suggestive of alcoholism, and a score of five or more points is indicative of alcoholism. Using these criterion a number of studies have determined that the MAST is a highly reliable and valid measure of alcoholism (Hedlund and Vieweg, 1984; Zung, 1982; Jacobsen, 1976; and Selzer, 1975 &1971). Alpha coefficients ranged from .86 to .95, indicating a high level of reliability. Validity measures show r = .83 when comparing scores on the General Alcoholism Factor of the Alcohol Use Inventory, and r = .31 - .46 for scores on the MacAndrews Alcoholism Scale of the MMPI for 100 individuals arrested for driving under the influence.

A more recent study (Ross, Gavin & Skinner, 1990) found that the optimum threshold score for alcoholism as measured by the MAST is 12/13. At this cutoff score false positives and false negatives are of equal weight. Overall accuracy at this score is .88. The researchers also found the MAST to be highly correlated (Pearson r = .79) with the Alcohol Dependence Scale. Hedlund & Vieweg (1984) found correlations between .31 to .46 with the MacAndrew Scale when administered to 100 individuals arrested for driving while intoxicated and attending an alcoholism education program.

Mortimer-Filkins Test

The final alcoholism measure used in the study is the Mortimer-Filkins test. Unlike the MacAndrews Alcoholism Scale and the MAST, the Mortimer-Filkins test was not administered as part of the test battery in the study. Rather, it was previously (between 1 and 12 months, in most cases) administered to each DUI offender through the Court Reporting Network intake procedure at the Allegheny County Probation and Parole

Department and the final test score was made available through the participating agencies, with the consent of the respondent. This score will not be used to determine level of alcohol use, but will provide information for an exploratory component of the study. Because the Mortimer-Filkins test is the primary tool used to determine the level of treatment or education that a DUI offender will be required to participate in as part of the court ordered rehabilitation for the DUI offense, its accuracy in determining the needed level of treatment is crucial. Assigning an individual to the wrong level of treatment may result in subsequent DUI offenses because inadequate rehabilitation was directed.

With this exploratory concept in mind, a brief description of the Mortimer-Filkins test is in order. The test is an interviewer administered questionnaire, consisting of 93 items on topics including marital relationship, employment, driving and arrest history, effects and use of drug and alcohol, and interviewer assessment. Results of the questionnaire are forwarded to the Pennsylvania Department of Transportation where they are scored and compared with existing driving and arrest records. The result is a brief report that includes a three digit final score. This score is then used to assess whether the offender is a nonproblem drinker (0-15), a presumptive problem drinker (16-23) or a problem drinker (24+).

Validity and reliability measures of the Mortimer-Filkins are show good results. Mortimer, Filkins, Kerlan and Lower (1973) found a high point-biserial correlation coefficient between test scores and criterion group membership (.92) and a high split-half reliability coefficient (.98). Studies on predictive validity of drunk driving recidivism, however, showed that only 3% of the variance of recidivism rates could be explained by correlations with the test scores (Wendling and Kolody, 1982).

To conclude the discussion of the measures of alcohol use, the primary measure of this variable will be obtained from the MAST score. While validation studies show the

MacAndrews is effective in identifying alcoholics and drug users, it does so by identifying a cluster of characteristics typically found in these individuals rather than assessing the actual involvement with alcohol. A measure of the actual alcohol use or misuse is preferred for this study.

Measures of Depression

Beck Depression Inventory

The Beck Depression Inventory is one of the most widely used test instruments for measuring the intensity of depression in psychiatric patients and for detecting possible depression in normal populations. It consists of a 21 item multiple choice test that is self-administered. Respondents read four statements and choose the one that best describes how they feel. The statements are rated 0, 1, 2, and 3, and depict progressive variations of the depressive component. For example, respondents would choose one of the following four statements: 0) I do not feel like a failure, 1) I feel I have failed more than the average person, 2) As I look back on my life, all I can see is a lot of failures, 3) I feel I am a complete failure as a person.

Each of the 21 items corresponds to a specific category of depressive symptomology using the four graduated statements to allow the respondent to identify how they feel about the category. Some of the 21 specific categories the test purports to measure include sadness, sense of failure, guilt, suicidal ideation, irritability, social withdrawal, insomnia, weight loss and somatic preoccupation.

The Beck Depression Inventory is part of the self-administered test battery. Respondents read the following instructions: "This questionnaire consists of 21 groups of statements. After reading each group of statements carefully, choose the number (0, 1, 2, or 3) next to the one statement in each group which **best** describes the way you have been feeling the **past week, including today** and mark this on the Comprehensive Answer Sheet. If several statements within a group seem to apply equally well, mark each one on the answer sheet. **Be sure to read all the statements in each group before making your choice.**" By assessing respondents' feelings in the past week, rather than in the immediate present, Beck (1987) contends that a more persistent depressive "trait" rather than a depressive "state" is being measured.

Scoring consists of summing the ratings given on each of the 21 items, yielding a range of 0-63. If the respondent chooses more than one rating on a given item, the score is the highest rating chosen. Item 19 (weight loss) is scored in a special manner. If the respondent indicates they are intentionally trying to lose weight, no score is recorded regardless of the selected response. The test manual indicates that with depressed patients, scores from 0-9 are considered within the normal range, or asymptomatic; scores from 10-18 indicate mild to moderate depression; scores from 19-29 indicate moderate to severe depression; and scores from 30-63 indicate extremely severe depression. With normal populations scores greater than 15 may indicate possible depression. However, a clinical evaluation is recommended before a diagnosis is established.

A number of reliability and validity studies have been completed on the Beck Depression Inventory with very favorable results. Beck, Steer and Garbin (in press) reviewed ten pretest-posttest reliability studies of the Beck and found the Pearson product moment correlations between pretest and posttest administrations ranged from .48 to .86 for psychiatric patients and ranged from .60 to .90 for normal populations. Beck and Beamesderfer (1974) questioned the stability of pretest-posttest studies with clinically depressed patients because these patients were expected to decrease their depressive symptoms as a result of the therapeutic environment as well as the passage of time. Internal consistency studies demonstrated a coefficient of .86 for the test items, and the Spearman-Brown correlation for the reliability of the Beck yielded a coefficient of .93 (Stehouwer, 1985).

Because the Beck Depression Inventory is high in face validity the possibility of denial or distortion of symptoms must always be considered a possibility. However, Beck (1970) conducted several studies using psychiatric patients and found coefficients of .66 between the Beck Depression Inventory and the Depression Adjective Checklist and .75 between the Beck and the MMPI Scale D.

Beck Hopelessness Scale

The Beck Hopelessness Scale is a 20 item true-false, self-administered measure assessing the construct of hopelessness which is a core feature of depression. It is often seen in suicidal persons, schizophrenics, alcoholics, and the physically ill. The underlying assumption behind the construct is that hopeless can be objectified by defining it as a system of cognitive schemas with negative expectations about the future being the common characteristic (Beck et al. 1974). Much of the research on the Hopelessness Scale has been carried out on clinical subjects and the scale has been found to be particularly useful in identifying suicidal patients.

Nine of the scale's 20 items are keyed true while 11 items are keyed false to minimize any tendency to answer in the same direction to all items. Examples of the items include: "I look forward to the future with hope and enthusiasm" (keyed false); "I might as well give up because I can't make things better for myself" (keyed true); and "I can't imagine what my life would be like in ten years" (keyed true). Respondents are simply instructed to reply true if they agree with the item and false, if they disagree. The scale is usually completed within ten minutes.

Scoring consists of assigning 0 or 1 to each item, depending on whether they are answered in the significant direction, with the scoring range being 0-20. While a score of nine or more is considered to be significant, scores as low as five must be viewed with caution because the scale is measuring cognitions that are associated with suicidal behavior.

Reliability of the Hopelessness Scale was tested with 294 psychiatric patients who had recently made suicide attempts. Internal consistency was high with a KR-20 reliability coefficient of .93. All of the 190 coefficients in the interitem correlation matrix were significant (range= .39-.76). The Hopelessness Scale was compared with results of an eight point clinical rating scale of hopelessness that was completed on two samples. The correlation with the first sample , 23 outpatients in a general medical practice, was .74 ($\rho < .001$) and the correlation with the second sample, 62 hospitalized patients who had recently made a suicidal attempt, was .62 ($\rho < .001$). The test was also validated using a sample of 59 depressed patients on an inpatient psychiatric unit. In this sample correlation of the Hopelessness Scale with the Stuart Future Test was .60 ($\rho < .001$) and the correlation with the pessimism item of the Beck Depression Inventory was .63 ($\rho < .001$).

A factor analysis using principal components analysis with varimax rotation was completed on the sample of 294 psychiatric patients who had attempted suicide, yielding three eigenvalues greater than unity, and therefore three factors were extracted. Factor 1 including items 1, 6, 13, 15, and 19, was labeled Feelings About the Future and consisted of affectively toned associations such as hope and enthusiasm, happy, faith, and good times. Factor 2 including items 2, 3, 9, 11, 12, 16, 17, and 20, was labeled Loss of Motivation, and was concerned with giving up; deciding not to want anything; and not trying to get something that is wanted. Factor 3, including items 4, 7, 8, 14, and 18, was labeled Future Expectations, and addresses what life will be like, a dark future, getting good things, things not working out, and the future being vague and uncertain.

Two other measures of depression were used in the study. These include the depression scale of the Symptom Checklist 90-Revised and Domain IV, Psychiatric Disorder, from the Drug Use Screening Inventory - Revised. Both will be discussed in the next section covering Measures of Psychological Well-being. Because of its high reliability and validity and almost universal acceptance as a superb measure of depression, the Beck Depression Inventory will be the primary measure of depression for the study. The other measures will be used to validate the results. Even though hopelessness is a component of depression, however, its characteristics are sufficiently unique to justify maintaining it as a separate variable for the study to explore whether DUI offenders identify with this construct.

Measures of Psychological Well-Being

Symptom Checklist 90 - Revised

The Symptom Checklist 90- Revised (SCL-90-R) is a self-administered 90 item measure of psychological symptoms in psychiatric and medical patients. For the study purposes, only 49 of the 90 items were used in the following scales: obsessive-compulsiveness, depression, anxiety, paranoid ideation and psychoticism. Each scale is comprised of 6-10 items assessing that construct and respondents rate those items on a 0-4 scale. Items from the various scales are intermixed throughout the test to avoid any patterning of response.

Respondents read the following instructions before beginning the test: "Below is a list of problems people sometimes have. Please read each one carefully and decide HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. On the Comprehensive Answer Sheet, record 0 if the problem *did not bother you at all*; record 1 if the problem bothered you *a little bit*; record 2 if the problem bothered you *moderately* ; record 3 if the problem bothered you *quite a bit* ; and record 4 if the problem bothered you *extremely* . Use only one number for each problem. Please answer all items". An example of an item from each of the study scales follows: "How much were you distresses by...Repeated unpleasant thoughts that won't leave your mind; Feeling low in energy or slowed down; Nervousness or shakiness; Feeling others are to blame for most of your troubles; and The idea that someone else can control your thoughts."

The SCL-90-R is scored by summing the numerical responses for each scale and dividing this by the number of items in the scale, yielding an average rating between 0 and 4 for the scale. These values can then be compared with normative data for males and females and patient and nonpatient populations, and charted on a score sheet that indicates T-scores for each scale. The T-scores range from 30 to 80, with 65 or greater considered significant.

Technical studies on the SCL-90-R show excellent reliability and validity. Coefficient alphas ranged from .77 to .90 for the various scales in a study of 219 symptomatic volunteers who completed the test (Derogatis, Rickels & Rock, 1976). Test-retest coefficients on a sample of 94 psychiatric outpatients ranged from .78 to .90 following a one week interval between testing (Derogatis, 1977). Using the SCL Analogue allows an opportunity to compare respondents' self ratings with those of a clinician thus providing a measure of interrater reliability. Using this method, Derogatis (1977) reported reliability coefficients ranging from .78 to .94.

Validation studies have primarily been conducted on the original SCL-90 test, which is identical to the SCL-90-R with the exception of two modified items and one completely changed item. Because both versions are very similar, reliability and validity studies for the SCL-90 are generally accepted for the SCL-90-R. Significant correlations between the SCL-90 subscales and symptom dimensions measured by the MMPI (Derogatis et al., 1976), the Beck Depression Inventory (Dinning & Evans, 1977), and the Denver Community Mental Health Questionnaire (Turner, McGovern & Sandrock, 1983) have been reported. The SCL-90 has also been used as a criterion measure to evaluate psychotherapy and behavioral treatment and successfully indicated positive change in group therapy with psychiatric patients (Beutler, Frank, Schieber, Calvert, & Gaines, 1984), in a support program for families of suicide victims (Rogers, Sheldon, Barwick, Letofsky, & Lancee, 1982), and with a group intervention program for people who had recently experienced multiple life stressors (Roskin, 1982). Overall, the SCL-90 and SCL-90-R have been shown to have excellent reliability and validity as measures of psychological symptoms.

Drug Use Screening Inventory - Revised (Behavior and Psychiatry Scales)

The Drug Use Screening Inventory - Revised (DUSI-R) is a self-administered 159 item questionnaire that is designed to provide a quick identification of disturbances in multiple spheres of health and daily functioning in known or suspected substance abusers (Tarter & Hegedus, 1991). It is completed by answering yes or no to items in ten domains. The first domain also includes an assessment of the number of times the respondent used various drugs over a time period. Only Domain II, measuring Behavior Pattern, including social isolation; anger; acting out; and self-control, and Domain IV, Psychiatric Disorder, including anxiety, depression, antisociality, and psychotic symptoms are used in the study. Each domain consists of 20 questions that the respondent assesses regarding their behavior or feelings over the past year. Respondents read instructions that direct them to "Answer all the questions. Even if a question does not apply exactly, answer according to whether it is MOSTLY YES (TRUE) or MOSTLY NO (FALSE). Answer the questions as they apply to you within the past year and leading up to the present time. If a question does not apply to you, answer no." Examples of items in Domain II are: "Did you argue a lot?"; "Did you have a bad temper?"; "Did you do things a lot without first thinking about the consequences?" and "Did you take advantage of people?" Examples of items in Domain IV include, "Have you been restless and unable to sit still?"; "Do you have trouble concentrating?"; "Have you been nervous?"; and "Did you have so much energy that you did not know what to do with yourself?" One potential limitation of the DUSI-R is that it was originally developed for use with adolescents. An adult form, however, has been developed and is used in this study. Validating information is discussed below.

When using the complete DUSI-R, scoring consists of three measures which consider how scores on each scale relate to the overall score. However, using only two scales limits the scoring to the absolute problem density score total for each scale. This consists of simply summing the number of "yes" responses for each scale and dividing this value by the number of items in the scale (20). This quotient is then multiplied by 100 to yield the absolute problem density score. The scoring literature indicates that the DUSI-R measures gradations of severity and, as such, no cut-off points have been established. Rather, the clinician establishes a cut-off point relative to the population served. In this regard it will be necessary to analyze the data before establishing the cut-off point.

The average reliability coefficient for males in a sample of 191 youth with an alcohol and drug abuse disorder was .74. The mean split-half reliability was .70 for males and the mean test-retest coefficient after one week in a sample of polysubstance abuse adolescents was .95 for males. On validity studies, significant correlations were found between eight of the ten DUSI-R scales and the substance abuse symptoms on the DSM-III-R checklist. Domain II, Behavior Problems, however, was one of the two scales that was not significant (just below the .05 level), while Domain IV, Psychiatric Disorder had a Pearson Product-Moment Correlation of .48 (<.01). A separate analysis showed that Domain IV, Psychiatric Disorder significantly correlated with the number of psychiatric diagnoses based on the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) ($r = .49$). Pearson Product-Moment correlations between the total K-SADS symptoms and the problem density scores for the various scales of the DUSI-R were significant (Behavior Problems - $r= .54$, $p < .01$ and Psychiatric Disorder - $r= .65$, $< .001$) (Tarter, Laird, Bukstein and Kaminer, 1992).

The measures of psychological well-being provide concise measures of several psychological behaviors or symptoms. The SCL 90-R depression scale will provide an additional depression score, along with the Beck Depression Inventory and the Beck Hopelessness Scale. The remaining SCL 90-R scales will provide measures of the specific symptoms they address (obsessive-compulsiveness, anxiety, paranoid ideation and psychopathy). These scales could be combined to form a measure of overall psychological distress that could be compared with Domain IV of the DUSI-R. The primary scale from the DUSI-R is Domain II, Behavior Problems. This construct will broaden the picture of DUI behavior, indicating whether it is supported by psychological factors or behavioral factors.

Measures of Sensation-Seeking and Impulsivity

The Zuckerman-Kuhlman Personality Questionnaire, version 3 (ZKPQ-III) was recently developed to measure the five basic personality traits that were derived from a series of factor analyses (Zuckerman, Teta, Joireman, & Carroccia, 1992). The traits include Impulsive Sensation Seeking; Neuroticism-Anxiety; Aggression-Hostility; Sociability; and Activity. For this study, only the Impulsive Sensation Seeking scale was used. This scale is comprised of 19 true-false items, 8 of which measure impulsivity and the remaining 11 measure sensation-seeking behavior. The impulsivity items measure a lack of planning and tendency to act impulsively without thinking while the sensation-seeking items measure the willingness to take risks for the sake of excitement or novel experience. They do not describe specific activities such as drinking or sex. The respondents are simply instructed to answer true or false to the items. Two of the impulsivity items are scored in the reverse to minimize patterned response. Examples of the impulsivity items include: "I usually think about what I am going to do before doing it (F)"; "I enjoy getting into new situations where you can't predict how things will turn out (T)"; and "I very seldom spend very much time on the details of planning ahead (T)." Significant responses to the sensation-seeking items are all scored as true. Examples of the sensation-seeking items include: "I like to have new and exciting experiences and sensations even if they are a little frightening"; "I like to do things just for the thrill of it"; and "I like to explore a strange city or section of town by myself, even if it means getting lost."

The scale is scored simply by summing the number of responses recorded in the keyed direction. The impulsivity and sensation-seeking items are usually scored together, but there is a provision in the scoring information to measure the two constructs separately. Although there is no specific cut-off point for significant scores, the average scores for males in two separate studies were, 11.12, SD 3.68; and 10.39, SD 4.35 (Zuckerman, Kuhlman, Teta, Joireman & Carroccia, 1992).

Alpha coefficients in two studies were .74 and .82 for males on the Impulsivity Sensation Seeking Scale and showed the ZKPQ-III to be highly reliable. The reliability between the Impulsivity Sensation Seeking Scale and the Eysenck Personality Questionnaire - Revised (EPQ-R) was .88 and the Impulsivity Sensation Seeking Scale was found to relate to the EPQ-R Psychoticism scale. Finally, the Impulsivity Sensation Seeking Scale correlated highly with Zuckerman's Sensation Seeking Scale. The total score correlation was .68 and high enough to assume the two scales are almost equivalent.

The Impulsivity Sensation Seeking Scale will provide a measure of these variables to determine whether they significantly impact DUI behavior. It is suspected that they, in conjunction with the other variables, will result in the blend of behaviors and personality characteristics that prompts DUI activity.

Chapter 5

Results

Data Analysis Plan

The data were analyzed with the Statistical Package for Social Sciences (SPSS) (Norusis, 1990), using several statistical techniques. First, psychometric analysis of the data was completed to ensure basic assumptions for the statistical procedures were met. The measures used in the study were subjected to a factor analysis procedure to determine whether more concise factor scores could be substituted for the numerous scales that were used. Reliability coefficients were computed for all scales that were to be used in the analysis. Because of an unequal distribution of African-American respondents in the non-DUI alcoholic group, tests were conducted to ensure that race was not a confounding variable.

Descriptive statistics for the various demographics variables were then obtained and analyzed for overt trends. A number of procedures were performed to determine whether there were significant differences among the three study groups on a number of the descriptive variables. The chi-square procedure was used when the variables were categorical and one-way analysis of variance was used when variables were at the interval or ratio level. When the one-way procedure was used the data were checked to ensure they were normally distributed and had equal variances. The t-test comparison of means was also used to help determine whether confounding variables existed.

To test the three hypotheses concerning levels of alcoholism, psychopathology and impulsive/sensation-seeking behavior, one-way analysis of variance with the Student-Newman-Keuls test for multiple comparisons was used.

The stepwise discriminant analysis procedure was then employed to assess the first two exploratory questions regarding the ability to determine group membership among

DUI offenders and, in fact, predict potential for future recidivism in first time offenders by knowing the specific variables that contribute to the DUI behavior. It is necessary to use discriminant function analysis because the dependent variable, level of DUI, is a categorical variable. The discriminant function analysis will indicate the unique contribution of each discriminating variable toward the prediction of the dependent variable and will also determine the best set of variables that collectively predicts the dependent variable. This will be useful to support the Problem-Behavior Theory concept that a cluster of behaviors, rather than one variable, best explains the problem behavior that is manifested as DUI.

Stepwise multiple regression analysis was used to address the third exploratory question regarding the relationship between the study variables and the number of times an individual drove under the influence, regardless of being caught. This procedure determines the amount of variance the predicting variables account for and the actual contribution of each predictor variable.

Finally, stepwise discriminant analysis was used again to study the last exploratory question addressing the effectiveness of the Mortimer-Filkins test. The contribution of the Mortimer-Filkins test to the discriminant solution and the percent of cases correctly classified was observed.

Consistent with the study design, some of the analyses were performed on all three groups to obtain a measure of discrimination or significance on all groups while other analyses were performed only on the two DUI offender groups to obtain differentiation between first time offenders and recidivists. In the case of all the statistical procedures, appropriate tests were conducted on the data to ensure they satisfied the assumptions for use of the statistic. Each of these analyses will be discussed in more detail below.

Psychometric Analysis

Transformation of Scales

The one-way analysis of variance, discriminant analysis and multiple regression procedures require a normal distribution of the data, with relatively equal variances. Several of the scales did not satisfy these assumptions and required transformation before the statistic could be employed. Table 1 shows the skewness and heterogeneity of variances before and after transformation for measures in which this was a problem.

Table 1

Skewness and Homogeneity of Variances (Cochran's C) for 3 Group (DUI) Comparison Before and After Transformation for Measures that Demonstrated a Problem With These Assumptions

	Before Transformation		After Transformation	
Measure	Skewness	Cochran's C (p-level)	Skewness	Cochran's C (p-level)
Times DUI (not caught)	2.34	.000	.05	.746
Beck Depression Inventory	1.73	.000	.03	1.000
Beck Hopelessness Scale	1.81	.000	-.73	.087
SCL Anxiety	2.28	.000	-1.00	.000*
SCL Depression	2.13	.000	-.60	.000*
SCL Obsessive-Compulsive	1.81	.000	-.49	.004*
SCL Paranoid	1.94	.000	-.36	.003*
SCL Psychopathy	2.50	.000	-1.23[a]	.000*
DUSI Psychiatry	1.20	.000	-.26	.574
DUSI Behavior	1.00	.000	.04	1.000

Note. A natural log transformation was utilized on Times DUI (not caught); a reciprocal transformation was utilized on all other measures.

* $p < .05$.

[a] Skewness > 1.00.

Measures not shown in Table 1 were normally distributed and had homogeneous variances, thus not requiring transformation. In all measures, except the SCL Psychopathy Scale, the transformation resulted in an acceptable skewness. The transformation also improved the heterogeneity of variances in all of the measures except the five SCL scales. Since no other transformation would eliminate the heterogeneity of variances in the SCL scales, they were used with this assumption not satisfied and the results will be interpreted with caution in this regard.

Development of Factor Scores

Before testing the hypotheses, several of the scales used in the study were subjected to a principal components factor analysis to determine whether more accurate factor scores could be identified to represent the desired variables. In all, 13 scales were tested using three DUI levels as well as two DUI levels.

The factor analysis procedure was employed because many of the scales used in the study were interrelated with each other, as can be seen by observing the intercorrelation matrix in Table 2. The factor analysis procedure can identify a small number of factors that can represent this larger number of intercorrelated variables (Norusis, 1990). In this way we can focus on more global constructs rather than specific test results. These global constructs represent larger clusters of differences between the respondents. By identifying clusters of differences in DUI offenders, we can build treatment programs that address the differences. For example, the number of critical constructs that contribute to a behavior such as DUI, and the relative importance of each construct, can be determined. This information can then be used to develop a treatment program that includes blocks of education or treatment time tailored to each critical construct.

The initial factor solution identified two factors with an eigenvalue > 1.00. While this solution nicely identified a scale measuring psychological distress, which included the Beck Depression Inventory, Beck Hopelessness Scale, and the five SCL 90 - Revised

Table 2

Intercorrelations for All Measures Used to Test the Hypotheses

Measure	1	2	3	4	5	6	7	8	9
1. Psychological Distress factor	1.00								
2. Alcohol factor	.00	1.00							
3. Impulsivity/sensation-seeking factor	.00	.00	1.00						
4. MacAndrews Scale	-.09	.83	.26	1.00					
5. MAST	-.32	.80	.10	.49	1.00				
6. Mortimer-Filkins Test	-.19	.60	.02	.40	.73	1.00			
7. Impulsivity Scale	-.30	.35	.71	.46	.44	.25	1.00		
8. Sensation-seeking Scale	-.12	.11	.91	.33	.27	.16	.53	1.00	
9. DUSI Behavior Scale	.53	-.39	-.35	-.41	-.53	-.37	-.53	-.40	1.00
10. DUSI Psychiatry Scale	.69	-.34	-.32	-.36	-.55	-.36	-.52	-.38	.78
11. Beck Depression Inventory	.76	-.33	-.08	-.37	-.46	-.33	-.35	-.27	.52
12. Beck Hopelessness Scale	.66	-.05	-.05	-.14	-.27	-.15	-.32	-.13	.35
13. SCL Anxiety Scale	.85	-.18	-.16	-.28	-.43	-.24	-.43	-.26	.57
14. SCL Depression Scale	.89	-.16	-.11	-.24	-.43	-.30	-.38	-.24	.56
15. SCL Obsessive-Compulsive Scale	.84	-.18	-.16	-.27	-.43	-.28	-.40	-.28	.57
16. SCL Paranoid Scale	.73	-.13	-.18	-.30	-.29	-.23	-.36	-.24	.50
17. SCL Psychopathy Scale	.85	-.14	-.16	-.25	-.39	-.26	-.43	-.24	.51

Table 2 (continued)

Intercorrelations for All Measures Used to Test the Hypotheses

Measure	10	11	12	13	14	15	16	17
10. DUSI Psychiatry Scale	1.00							
11. Beck Depression Inventory	.60	1.00						
12. Beck Hopelessness Scale	.45	.55	1.00					
13. SCL Anxiety Scale	.68	.66	.51	1.00				
14. SCL Depression Scale	.67	.72	.51	.79	1.00			
15. SCL Obsessive-Compulsive Scale	.68	.66	.47	.76	.78	1.00		
16. SCL Paranoid Scale	.57	.58	.40	.62	.63	.65	1.00	
17. SCL Psychopathy Scale	.66	.65	.49	.74	.80	.72	.60	1.00

scales, the second factor represented two constructs, including alcoholism and impulsivity/sensation-seeking. Consequently, a three factor solution was attempted. This resulted in a factor solution with varimax rotation that identified three factors with an eigenvalue greater than .8 from 12 of the scales that were subjected to the analysis. The rotated factor matrix included factors measuring alcoholism (Alcohol), psychological distress (Psych Distress), and impulsivity/sensation-seeking behavior (IMP/SS). The DUSI Behavior Scale did not load solidly on any one factor. To improve the factor solution, this scale was excluded. The final factor loadings from the rotated factor matrix are shown in Table 3. The reliabilities for each scale are also included in Table 3.

Separate factor analyses found that there were no critical differences in the factor structure when individually testing the non-DUI alcoholics, the first time offenders, the recidivists, or the first offenders and recidivists. The 12 scales essentially loaded on the three factors in the same way as they did when the combined analysis was conducted.

A final version of the factor analysis again resulted in the same factor structure when the 49 item MacAndrews Scale was used instead of the 51 item scale. The 49 item scale eliminates two items relating directly to drinking behavior and is recommended in some situations where clients show strong denial (MacAndrew, 1981).

The factors that were extracted were used in conjunction with the scales to test the hypotheses. They were then used as the primary variables to test the exploratory questions using the discriminant analysis and multiple regression procedures.

Description of the Sample

The total sample consisted of 296 male individuals from two agencies with three different DUI levels in each agency, including Level 1, non-DUI alcoholics; Level 2, DUI first offenders; and Level 3, DUI recidivists. Data on a sample of 104 females were also gathered as part of the data collection. These data will be analyzed separately in another study. Table 4 displays a breakdown of the sample by group and agency. The totals from

Table 3

Varimax Rotated Factor Matrix and Subscale Reliability (α)

		Factors		
Measure	α	Psych Distress (eigenvalue=5.80)	Alcohol (eigenvalue=1.54)	IMP/SS (eigenvalue=.81)
Beck Depression Inventory	.85	*.76*	-.33	-.08
Beck Hopelessness Scale	.83	*.66*	-.05	-.06
SCL Anxiety	.86	*.85*	-.18	-.16
SCL Depression	.91	*.89*	-.16	-.11
SCL Obsessive-Compulsive	.87	*.84*	-.18	-.16
SCL Paranoid	.77	*.73*	-.13	-.18
SCL Psychopathy	.81	*.85*	-.14	-.16
DUSI Psychiatry	.88	*.70*	-.34	-.32
MacAndrews Scale	.56	-.09	*.83*	.26
MAST	.89	-.32	*.80*	.10
Sensation-seeking	.81	-.12	.11	*.91*
Impulsivity	.78	-.29	.35	*.71*

Note. Items in italics loaded on factor to .8 criterion.

each agency are almost identical, but Agency A provided a higher number of recidivists while Agency B provided a higher number of first time offenders. With the exception of a very low number of refusals (< 10), the sample consisted of the population of program participants at each agency during the data collection time period, thus limiting sources of sampling error. Table 5 shows the frequency of race in the three study groups and reveals

Table 4

Sample Size of the Three DUI Levels by Agency

	N			
DUI Level	Agency A	Agency B	Total	%
Non-DUI Alcoholics	32	20	52	17.6
First Time Offenders	51	71	122	41.2
Recidivists	71	51	122	41.2
Total	154	142	296	100

Table 5

Frequency of Race in the Three DUI Levels

	DUI Levels			
Race	(1) Non-DUI Alcoholics	(2) First Offenders	(3) Recidivists	Total
African American	21	5	4	30
Caucasian	30	106	111	247
Hispanic	0	1	1	2
Oriental	0	0	0	0
Other	0	0	0	0
Total[a]	51	112	116	279

[a] Seventeen participants did not indicate a response for Race.

that the sample is heavily biased towards Caucasians. As indicated above, however, the frequency of race is a representation of the clientele using the agencies rather than a function of the sampling procedure. However, this presents the possibility of a confounding variable and will be addressed later. The age range of the three study groups is presented in Table 6. The sample primarily represents younger drinkers, with the youngest three age groups, including the age range 20-34, accounting for over 50% of the participants.

Table 6

Age Range of the Participants by DUI Level

	DUI Level			
Age Range	(1) Non-DUI Alcoholics	(2) First Offenders	(3) Recidivists	Total
20 - 24	6	20	13	39
25 - 29	10	25	23	58
30 - 34	14	24	25	63
35 - 39	11	22	19	52
40 - 44	7	13	21	41
45 - 49	0	6	7	13
50 - 54	2	6	5	13
55 - 59	2	2	6	10
60 +	0	4	3	7
Total	52	122	122	296

$\bar{X} = 35.12$.
SD = 9.86.

Race was dichotomized into two groups, "white" and "other", for cross tabulation with other variables. Similarly, marital status was recoded to group the one widower respondent from the non-DUI alcoholic group into the "married" category. Recoding was done to satisfy the assumptions for chi-square.

Chi-square results revealed that there were significant differences among the three groups on race, marital status, prior drug and alcohol treatment, and prior mental health treatment. The direction of the effects shows that there were significantly more African-Americans in the non-DUI alcoholic group than in the other two groups. In the statistical analysis we will control for race to ensure that any observed effects are due to the measured variables rather than confounded by the disproportionate distribution of race. On marital status, the direction of effects shows that more recidivists were divorced than the other two groups and that more non-DUI alcoholics were separated than in the other two groups ($p = .05$). In a two group analysis, a marginally significant difference ($p < .10$) was shown with first time offenders being more likely to be single than recidivists and recidivists being divorced more often than first time offenders ($p < .10$).

The chi-square comparison of prior drug and alcohol treatment showed that the non-DUI alcoholics and the recidivists had significantly more prior treatment for drug and alcohol abuse than the first time offenders ($p < .001$). In a two group comparison, the recidivists also showed significantly more prior treatment than the first time offenders ($p < .001$). The comparison of prior mental health treatment showed a significant difference among the groups, with non-DUI alcoholics having prior treatment much more often than the other two groups ($p < .001$). On the two group comparison of prior mental health treatment, there was no difference between the first time offenders and the recidivists. The chi-square results and significance levels for these demographics variables are reported in Table 7.

To test whether there were differences among the three groups on interval or ratio level demographic variables, one-way analysis of variance was used. The results,

Table 7

Pearson Chi-Square Between Several Demographic Variables and DUI Level

Variable	Chi-Square	df	p
Race[a]	42.04	2	<.001
Race[b]	.63	1	ns
Marital Status	12.54	6	.05
Marital Status[b]	7.23	3	< .10
Prior Drug or Alcohol Treatment	55.97	2	<.001
Prior Mental Health Treatment	30.46	2	<.001
Prior Mental Health Treatment[b]	<.001	1	ns

[a] Dichotomized categories - Caucasian and other.
[b] Comparison with first offenders and recidivists only.

including the means for each variable, are displayed in Table 8. This table displays the natural logarithm transformed results for number of times DUI per year and not caught, *which corrects for skewness and heterogeneity of variances.*

Breath Alcohol content was measured at the time of the DUI offense for the first time offenders and recidivists. Since they had no DUI offense, this variable was not measured on the non-DUI alcoholics.

Examining the results of the one-way ANOVA for the variables reported as significant in Table 8, the direction of the effects show that "breath alcohol content" is marginally higher in recidivists than first time offenders, that "education" is highest in non-DUI alcoholics, followed by first time offenders and then recidivists, and that "number of times DUI per year - not caught" is highest for non-DUI alcoholics, followed by recidivists and then first time offenders.

Table 8

Results of One-way ANOVA of Interval Demographic Variables by DUI Level

	Mean				
Variable	Non-DUI Alcoholics	First Time Offenders	Recidivists	F	p
Age	34.33	34.24	36.33	1.57	ns
Breath Alcohol Content[a]	n/a	.194	.209	3.21	.07
Education	13.02	12.80	12.32	2.62	.07
Number of Times DUI per Year (not caught)[b]	3.69[c]	2.41	2.72	10.03	<.001

[a] This variable not measured in non-DUI alcoholics.

[b] Log transformed data to correct for skewness and heterogeneity of variance.

[c] Student-Newman-Keuls ($p < .05$) difference between this group & both other groups.

The variables age, breath alcohol content, education and marital status did not affect the outcome of the results. Since the differences in race among the groups were significant, additional tests were conducted to ensure it did not affect the results.

Results of the Tests to Rule Out Race as a Confounding Variable

The results of Table 5 and the preceding discussion identify the significant differences among the groups on the race variable. In particular, the non-DUI alcoholic group is over-represented by African-Americans. To ensure that the results of further testing were not spurious, two sets of t-test comparisons were completed. In the first set of t-tests, race was dichotomized into Caucasians and other groups and compared on all the measures. In the second set of tests, the non-DUI alcoholics were compared with a combined group including the first time offenders and the recidivists. The test was conducted with and without the African-Americans.

In the first set of t-tests, race was dichotomized into Caucasians and other groups and compared on all the measures. Table 9 reveals there were significant differences between the Caucasians and other respondents on all measures except the Sensation-Seeking Scale and the Impulsivity/sensation-seeking factor.

The results of the second t-tests, in Table 10, indicate that the significance level changed on 2 of the 15 scales. The significance level on the SCL Paranoid Scale was less

Table 9

Comparison of Race Dichotomized Into Caucasian and Other Race, With Measures

	Mean			
	Caucasian	Other Race	t	p
Beck Depression Inventory	.066	.052	-3.71	.001
Beck Hopelessness Scale	.083	.076	-2.60	.012
DUSI Psychological Scale	.076	.061	-4.04	<.001
Psychological Distress factor	.079	-.608	-3.17	.003
SCL Anxiety Scale	.843	.723	-2.90	.006
SCL Depression Scale	.774	.661	-2.66	.011
SCL Obsessive-Compulsive	.776	.653	-3.05	.004
SCL Paranoid Scale	.757	.597	-3.76	.001
SCL Psychopathy Scale	.876	.731	-3.54	.001
Alcohol factor	-.066	.533	3.29	.002
MAST	18.228	24.789	2.51	.016
MacAndrews Scale	26.469	29.895	4.38	.000
IMP/SS factor	-.023	.097	.61	.544
Impulsivity Scale	2.018	3.210	2.87	.006
Sensation-seeking Scale	4.275	4.737	.81	.422

than .001 when African-Americans were included, but .07 when they were excluded.

On this scale, the mean score for the Caucasian non-DUI alcoholics was .69, while the mean score for the entire group of non-DUI alcoholics (including African-Americans) was .60. The means for the DUI offenders were both .77. Reversing the scores to account for the reciprocal transformation, this lends support to the notion that the

Table 10

Differences With and Without African-American Respondents Between Non-DUI Alcoholics and All DUI Offenders

	All Respondents		Excluding African-Americans	
Measure	t	p	t	p
Beck Depression Inventory	6.42	<.001	4.10	<.001
Beck Hopelessness Scale	4.56	<.001	3.32	.002
DUSI Psychological Scale	7.96	<.001	4.96	<.001
Psychological Distress factor	5.92	<.001	3.46	.002
SCL Anxiety Scale	6.27	<.001	3.97	<.001
SCL Depression Scale	6.43	<.001	4.14	<.001
SCL Obsessive-Compulsive	6.08	<.001	3.78	.001
SCL Paranoid Scale	4.58	<.001	1.87	.071
SCL Psychopathy Scale	5.71	<.001	3.40	.002
Alcohol factor	5.35	<.001	4.29	<.001
MAST	7.76	<.001	6.32	<.001
MacAndrews Scale	4.46	<.001	2.28	.029
IMP/SS factor	2.05	.044	1.32	.196
Impulsivity Scale	5.98	<.001	4.28	<.001
Sensation-seeking Scale	3.23	.002	2.09	.044

African-Americans score higher on the paranoid scale than the Caucasians.

The significance level on the Impulsivity/sensation-seeking factor score was .04 when the African-Americans were included and .20 when they were excluded from the analysis. On this factor, the mean score for the Caucasian non-DUI alcoholic group was .22 while the mean score for the entire group of non-DUI alcoholics (including African-Americans) was .29. The means for the Caucasians only DUI offenders and the entire group of DUI offenders were both -.06. Examining these scores lends some support to the notion that the African-Americans score slightly higher on measures of impulsivity and sensation-seeking than the Caucasians.

The results of the comparisons between the grouping variable, where race is a disproportionate distribution in the non-DUI alcoholic group, and scale, indicate a slight possibility of race as a confounding variable. However, the comparisons between dichotomized race and the scales indicate a stronger possibility that race could be a confounding variable. To guard against this, additional controls for race will be used in the hypothesis testing, discriminant analysis and multiple regression procedures later in this study.

Results of the Tests for Hypothesis 1

The first hypothesis states that "non-DUI alcoholics and recidivists will score higher on measures of alcoholism than first time offenders. Non-DUI alcoholics will score the highest on these measures" This hypothesis was tested using the one-way analysis of variance procedure with the Student-Newman-Keuls test for multiple comparisons. Three primary measures of alcoholism were used, including the MacAndrews Scale (MAC), the Michigan Alcoholism Screening Test (MAST), and the Alcohol factor score derived from the principal components factor analysis. As a final and secondary measure of alcoholism, the score on the Mortimer-Filkins test was added for the two DUI offender groups.

The results of the one-way analysis of variance tests are shown in Table 11. These results, with the Student-Newman-Keuls procedure support the hypothesis. Non-DUI alcoholics had significantly higher scores than recidivists ($p < .05$) and they had significantly higher scores than first time offenders ($p < .05$) on all three primary measures of alcoholism. Additionally, recidivists scored significantly higher ($p < .001$) than first time offenders on the Mortimer-Filkins test. No problems arose regarding heterogeneity of variance on the Mortimer-Filkins test.

Table 11

One-way ANOVA Comparison Using Four Measures of Alcoholism by DUI Level

	Mean				
Alcoholism Measure	Non-DUI Alcoholics	First Time Offenders	Recidivists	F	p
MacAndrews Scale	29.42	25.39	27.33	16.65	<.001
MAST	31.17	10.69	22.09	66.89	<.001
Alcohol factor	.6070	-.5238	.2608	37.95	<.001
Mortimer-Filkins Test	n/a	41.92	74.80	88.05	<.001

Note. The Student-Newman-Keuls procedure showed the following significant differences ($p < .05$) on the MacAndrew Scale, MAST and Alcohol factor: non-DUI alcoholics and first time offenders, non-DUI alcoholics and recidivists, and first time offenders and recidivists.

The comparison was repeated using only the Caucasian respondents because of the previously discussed relationship of race to group and scale. This did not alter the results.

Using a cutoff score of ≥ 12 on the MAST as one measure of alcoholism (Ross, Gavin & Skinner, 1990), observation of the frequencies of the first time offenders and recidivists shows that 68% of the first time offenders scored in the non-alcoholic range and 32% scored in the alcoholic range, while 24.6% of the recidivists scored in the non-alcoholic range and 75.4% scored in the alcoholic range. Likewise, on the MacAndrews test, with a cutoff of ≥ 24 for alcoholism, 32% of the first time offenders scored in the non-alcoholic range while 68% scored in the alcoholic range and 21.5% of the recidivists scored in the non-alcoholic range with 79.5% scored as alcoholic. Finally, on the Mortimer-Filkins test, using a cutoff of ≥ 24 for a problem drinker*, 21.2% of the first time offenders scored in the non-problem drinker range while 79.8% were identified as problem drinkers and 4.3% of the recidivists scored in the non-problem drinker range while 95.7% scored as problem drinkers.

Results of the Tests for Hypothesis 2

The second hypothesis states that "recidivists and non-DUI alcoholics will score higher on measures of psychopathology than first time offenders. Recidivists will score the highest on these measures." The rationale for the hypothesis derives from the Problem-Behavior Theory notion that problem behaviors are the result of an interplay between numerous other characteristics or problem behaviors in the individual's life. While non-DUI alcoholics have many problems, they have, at least, been able to control their driving while intoxicated behavior, or at least not having accidents or getting caught. DUI recidivists, on the other hand, have not been able to avoid DUI offenses, possibly as a result of other psychological problems.

This hypothesis was tested using the one-way analysis of variance procedure with the Student-Newman-Keuls test for multiple comparisons. Several individual scales and one factor score were used to measure level of psychopathology.

The results of the one-way analysis of variance, shown in Table 12, partially support the hypothesis. The direction of the scores was consistent across all the measures of psychopathology but only somewhat in the hypothesized direction. The one-way analyses of variance of each psychopathology measure by the three DUI levels shows a

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* Scoring on the Mortimer-Filkins rates respondents as non-problem drinker, presumptive problem drinker, or problem drinker. There is no category for alcoholic.

Table 12

One-way ANOVA Comparison of Means on Measures of Psychotherapy by DUI Level

Psychopathology Measure	DUI Level Non-DUI Alcoholic	First Time Offender	Recidivist	F (2, 293)	eta^2 (1)
Psych Distress factor^2	-.94	.20	.20	34.51*	.19
Beck Depression Inv.^{3}	.05	.07	.07	31.29*	.18
Beck Hopelessness ^{3}	.07	.08	.08	17.23*	.11
SCL Anxiety^3	.64	.87	.87	43.85*	.23
SCL Depression^3	.56	.81	.79	39.86*	.21
SCL O-C^3	.58	.81	.79	30.27*	.17
SCL Paranoid^3	.60	.77	.76	14.38*	.09
SCL Psychopathy^3	.68	.91	.88	41.98*	.22
DUSI Psychiatric^3	.05	.08	.08	42.23*	.22

[1] Eta^2 is given by the formula $\eta^2 = SS_{Between} / SS_{Total}$.
[2] Factor score using transformed scales; reverse signs due to transformation; means expressed as z-scores.
[3] Transformed scale - lower values represent higher means.
* $p < .001$.
Note. Student-Newman-Keuls test shows that the non-DUI alcoholics are significantly different from the first time offenders and the recidivists on all measures at $p < .05$.

significant F ($p < .001$), indicating that there is a significant difference between at least two of the means. The Student-Newman-Keuls test reveals that the difference on all the measures lies between the non-DUI alcoholics and the first time offenders and between the non-DUI alcoholics and the recidivists, but not between the first time offenders and the recidivists. An examination of the means reveals that the non-DUI alcoholics display the highest levels of psychopathology, and that these levels are significantly higher than those of the DUI recidivists or the first time offenders. There were no significant differences between the first time offenders and the recidivists, although the mean scores for the recidivists were consistently higher than those for the first time offenders.

In order to show the proportion of variance in the DUI level (the dependent variable) which is statistically explained by the psychological measure (the independent variable), the values for eta squared (η^2) are also shown in Table 12. The variance accounted for ranged from .09 (SCL Paranoid Scale) to .23 (SCL Anxiety Scale).

No specific scale showed a significant difference between the three groups although all scales showed significant differences between the non-DUI alcoholics and the two DUI groups. The task of identifying the specific differentiating variables is therefore left to the discriminant analysis procedure that will be discussed later.

To test whether actual differences exist between the first time DUI offenders and the recidivists, the one-way ANOVA procedure was repeated on these two groups. The results were similar to those of the three group test with two exceptions. The first simply involves the distribution of the data. Cochran's C improved substantially on all measures. The other exception was that the one-way ANOVA showed a significant difference between the groups on the Beck Depression Inventory ($p < .05$) with the recidivists displaying higher depression scores. There were no significant differences on any of the other scales.

Finally, the comparison was repeated using only the Caucasian respondents because of the previously discussed relationship of race to group and scale. This did not alter the results.

The results for hypothesis two, then, reveal that non-DUI alcoholics, rather than recidivists, scored highest on measures of psychopathology. While the recidivists scored consistently higher than the first time offenders across all measures of psychopathology, the scores were not significantly higher. The hypothesis is, therefore, not supported.

Results of the Tests for Hypothesis 3

The third hypothesis states that "Recidivists will show the highest levels of impulsivity, sensation-seeking, and anti-social behavior. Non-DUI alcoholics will show the lowest levels of these variables." The hypothesis was tested using the one-way analysis of variance procedure with the Student-Newman-Keuls test for multiple comparisons. Three individual scales and one factor score were used to measure levels of the variables, including the Impulsivity Scale, Sensation-seeking Scale, DUSI Behavior Scale, and the Impulsivity/sensation-seeking factor.

Results from the one-way analysis generally disprove the hypothesis. Table 13 indicates that the non-DUI alcoholics show the highest levels on all the variables rather

Table 13

One-way ANOVA Comparison of Means on Measures of Impulsivity, Sensation-seeking and Anti-social Behavior by DUI Level

	DUI Level			
Behavioral Measure	Non-DUI Alcoholic	First Time Offender	Recidivist	F (2, 293)
Impulsivity/ Sensation-seeking factor	.29[a]	.03	-.15	3.73*
Impulsivity Scale	3.94[b]	1.67	1.91	24.42***
Sensation-Seeking Scale	5.73[b]	4.06	4.09	6.28**
DUSI Behavior Scale	10.21[b]	4.37	4.78	42.39***

[a] Student-Newman-Keuls test - significantly different from recidivists - $p < .05$.
[b] Student-Newman Keuls test - significantly different from first time offenders and recidivists - $p < .05$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

than the lowest. In addition, recidivists showed the lowest score on the Impulsivity Sensation-seeking factor rather than the highest level, as hypothesized. On this measure there was a significant difference ($p < .05$) between the non-DUI alcoholics and the recidivists but not between the non-DUI alcoholics and the first time offenders. The results of the Student-Newman-Keuls procedure on the remaining three measures show that the non-DUI alcoholics have significantly higher mean scores ($p < .05$) than the other two groups and the scores of the other two groups are not significantly different from each other.

The analysis was repeated comparing the first time offenders and the recidivists and revealed no change in the results. Finally, the analysis was again repeated using only the Caucasian respondents because of the possible confounding effects of race. The results were essentially the same on all measures.

Results of the Tests for Exploratory Research Question 1

The first exploratory research question asked, "Can we differentiate first time DUI offenders into high and low risk groups by observing the characteristics of a sample of first time offenders, recidivists, and non-DUI alcoholics? If so, can we apply the same process to identify first time offenders who may be high risk to repeat the DUI offense at some point in the future?" This question was addressed through the use of the stepwise discriminant analysis procedure.

Although the discriminant analysis procedure is a robust test, several assumptions should be considered before proceeding (Klecka, 1980). These include:

1) The data cases should be members of two or more mutually exclusive groups.

2) There must be at least two cases per group.

3) The number of discriminating variables must be less than the total number of cases minus 2.

4) Discriminating variables are measured at the interval level.

5) No discriminating variable may be a linear combination of other discriminating variables.

6) The covariance matrices for each group must be approximately equal.

7) Each group has been drawn from a population with a multivariate normal distribution on the discriminating variables.

There was no difficulty satisfying the assumptions. The data cases are clearly members of three distinct groups, including non-DUI alcoholics, first time offenders and recidivists, and each group has far more than two cases each. Since there are only three discriminating variables, the third assumption is satisfied: $3 < 296 - 2$. The three discriminating variables are measured at the interval level and, since they are factor scores, they do not represent a linear combination of other discriminating variables. Observation of the covariance matrices for the three DUI levels reveals they are, in fact, approximately equal (.63, -1.26, and -1.07). Finally, examination of the frequencies of the three factor scores reveals that the distribution of the data for the three factor scores is normal. The skewness values for Psychological Distress (-.799), Alcoholism (.266) and Impulsivity/sensation-seeking (.514) are quite acceptable.

With the assumptions satisfied, it was possible to use the stepwise discriminant analysis procedure. An understanding of a number of the components of discriminant analysis is useful (Hair, Anderson, Tatham & Black, 1989; Klecka, 1980). The basic purpose of discriminant analysis is to estimate the relationship between a categorical dependent variable and a set of independent variables. A number of statistical activities are used to interpret differences among two or more groups and are used to classify cases into groups. We can discriminate between the groups on the basis of a set of characteristics or discriminating variables and determine how well and in which direction they discriminate, and which variables are the most powerful discriminators. The discriminating variables are the three factor scores, Psychological Distress, Alcohol, and Impulsivity/sensation-seeking, and the grouping variable is "DUI level."

In order to determine whether differences exist between the groups and to classify cases into predicted groups, we derive canonical discriminant functions. The number of functions is equal to the number of groups minus one, or the number of discriminating variables, whichever is less. The unstandardized canonical discriminant function coefficients are used in a formula to determine the discriminant score for each respondent. The average of these scores within a group is the group centroid. The statistical measure of significance (Wilks' lambda) compares the overlap of distribution of the discriminant scores to determine the group's uniqueness. Along its range from 0 to 1, a value of 1 occurs when the group centroids are identical, indicating there are no group differences. The canonical correlation coefficient tells us how different the groups are on each function and the standardized canonical discriminant function coefficients indicate which variables contribute or weigh most when determining the scores on each function. Finally, the structure coefficients, ranging from -1 to 1, provide a better measure of which variables contribute most to determining scores on each function when the variables are correlated.

The discriminant scores also allow us to classify respondents into the highest probability predicted groups and are especially useful because they are represented in standard deviation units. From here we can determine the percent correctly classified and compare this with the percent which would be expected by chance.

The results of the stepwise procedure are shown in Table 14. The minimum F-to-enter was 1.00 and the maximum F-to-remove variables from the equation was 1.00. Wilks' lambda after all the variables were entered was .57 ($\underline{p} < .001$) and reveals that the groups are significantly different on the discriminating variables. The analysis identified two functions with eigenvalues of .57 (83.7% of variance) and .11 (16.3% of variance). The canonical correlation coefficients for the functions are .60 and .32 respectively. For the first function, the unstandardized canonical discriminant function coefficients, used to build the predicted group formula are: Psychological Distress (.93), Alcohol (.81), and

Table 14

Stepwise Discriminant Analysis of Three Factor Scores by DUI Level

Variable	Step Entered	Wilks' λ at Step Entered	F	p
Psych Distress	1	.77	44.08	<.001
Alcohol	2	.59	43.69	<.001
IMP/SS	3	.57	31.02	<.001

Impulsivity/sensation-seeking (.20). Similarly, the values for the second function are .58, -.77, and .41. Using these coefficients in the formula, the SPSS program was able to correctly classify 56.95% of the cases. Using the proportional chance criterion (Hair et al., 1989), the correct classification would be 36.70%*. By using the discriminant analysis procedure, classification was improved by 55.2%. The actual classification results are shown in Table 15, including identification of high and low risk cases.

By observing Table 15 it is a straightforward step to identify high and low risk members of the groups. A high risk individual is defined as one who is predicted to belong to a group that represents more severe behavior than the group to which the individual actually belongs. A low risk individual is defined as one who is predicted to belong to the group they are actually assigned to. A high risk first time offender, then, is actually a member of the first time offenders' group, but predicted to be a member of either the recidivists' group or the non-DUI alcoholics' group. A low risk first time offender is predicted to belong in the first time offenders' group. Likewise, a high risk recidivist is actually a member of the recidivists' group but predicted to be a member of

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* The formula for proportional chance criterion is given as, $C_{pro} = p_1^2 + (1 - p_2)^2 + (1 - p_3)^2$, where p_1 is the proportion of individuals in the non-DUI alcoholics' group, $(1 - p_2)$ is the proportion of individuals in the first time offenders' group, and $(1 - p_3)$ is the proportion of individuals in the recidivists' group.

Table 15

Discriminant Analysis Group Classification Results and Identification of High Risk Cases Among the DUI Groups

		Predicted Group		
Actual DUI Level	n	(1)	(2)	(3)
Non-DUI Alcoholics (1)	52	38 73.1%	3 5.8%	11 21.2%
First Time Offenders (2)	121	12[a] 9.9%	78[b] 64.5%	31[a] 25.6%
Recidivists (3)	122	27[a] 22.1%	43 35.2%	52[b] 42.6%

[a] High risk - the predicted group represents more serious behavior than the actual group.
[b] Low risk - the predicted group is the same as the actual group.
Note. Total correctly classified = 56.95%.

the non-DUI alcoholics' group while a low risk recidivist is predicted to belong to the recidivists' group.

An additional stepwise discriminant analysis procedure was conducted adding race as a possible discriminating variable to control for any possible effects race may have on the analysis. The results indicate that race was entered into the equation third, following Psychological Distress and Alcohol and before Impulsivity/sensation-seeking and Wilks' lambda at this step was .58 ($p < .001$). The overall Wilks' lambda was .56 ($p < .001$). The first function identified in the discriminant analysis was, of course, the most powerful discriminator (eigenvalue = .60, accounting for 84% of variance). The canonical correlation coefficient was .61 and the standardized canonical discriminant function coefficient was (.36). Entering race into the equation had very little effect on the coefficients for the other variables which included Psychological Distress (.72), Alcohol

(-.65) and Impulsivity/sensation-seeking (-.21). Finally, the percent of grouped cases correctly classified by adding race to the equation was 59.86%.

Results of the Tests for Exploratory Research Question 2

The second exploratory research question states, "Within the purview of the study variables, can we identify those variables that contribute most accurately to the assignment of group membership?" An extension of the discriminant analysis procedure is used to determine this information. Since the first function is the most powerful discriminator, accounting for 83.7% of the variance, it is most logical to examine the variables that load on it. By examining the standardized canonical discriminant function coefficients for the first function, we can determine which variables contribute the most to determining scores on that function. The scores are: Psychological Distress (.82), Alcohol (.72) and Impulsivity/sensation-seeking (.20), indicating the order of importance of the variables in assigning group membership. The positive direction of these scores points to increasing levels of each variable relative to its importance.

Although function 2 accounts for only 16.3% of the variance as a discriminator, it is worth examining its standardized canonical discriminant function coefficients to ascertain their contribution. In this case, Alcohol is the most important variable (-.69), followed by Psychological Distress (.51) and Impulsivity/sensation-seeking (.41).

Results of the Tests for Exploratory Research Question 3

The third exploratory question asks, "What characteristics are associated with individuals who frequently drive under the influence, regardless of whether they are caught?" The number of times an individual drives under the influence per year without getting caught is a continuous variable, thus allowing the use of multiple regression analysis. The stepwise multiple regression procedure attempted to identify the best set of variables that would predict the dependent variable.

Since a factor analysis had previously identified desirable factor scores for a number of scales rating alcoholism, psychopathology and impulsivity/sensation-seeking behavior, these factors were used as the independent variables. The log transformed version of "Times DUI per year but not caught" was the dependent variable.

The results of the stepwise multiple regression analysis reveal that the three factor variables account for 14.1% of the variance in the dependent variable ($R^2 = .141$, $p < .001$). In order of importance, Alcoholism contributes most to the prediction of times DUI - not caught (beta = .29, $p < .001$), while Psychological Distress (beta = .16, $p = .003$), and Impulsivity/sensation-seeking (beta = .16, $p = .005$) contribute about the same. The slope values from this regression analysis form the basis for the predictive formula and include: Alcohol (.50), Psychological Distress (.29), Impulsivity/sensation-seeking (.27) and the constant (2.74). It is interesting in this analysis, that the incidence of driving under the influence increases as the amount of psychological distress decreases*. This is not in the expected direction and suggests the need for additional research in this area.

Using only the two DUI groups with the same independent variables, the multiple regression results are slightly different, but still significant. In this case, 13.0% of the variance in the dependent variable is accounted for ($R^2 = .130$, $p < .001$). Alcoholism contributes most to the prediction of times DUI - not caught (beta = .29, $p < .001$), Impulsivity/sensation-seeking contributes next (beta = .20, $p = .001$) and Psychological Distress contributes the least to the amount of variance accounted for (beta = -.15, $p < .05$). The slope values from this regression analysis are: Alcohol (.47), Impulsivity/sensation-seeking (.35), Psychological Distress (-.30) and the constant is 2.71. In this analysis, the levels of the three variables increase as the incidence of driving under the influence increases, as we would expect.

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* Recall that the score value is reversed due to the reciprocal transformation.

A final application of the multiple regression procedure was performed using race as an additional independent variable and forcing it into the equation as a control variable. This was done to rule out any possible confounding effects race may have on the results. The procedure yields almost identical results ($R^2 = .136$, $p < .001$) and race contributes very little to the prediction (beta = .02, $p = .72$).

Results of the Tests for Exploratory Research Question 4

The fourth research question asks, "Do Mortimer-Filkins test scores correspond with other measures associated with high risk offenders that are identified in this study?" Like the first two exploratory research questions, this question was addressed through the stepwise discriminant analysis procedure. The grouping variable was the two experimental DUI Levels (first time offenders and recidivists) and the Mortimer-Filkins score was used as an additional discriminant variable along with the three factor scores. It was necessary to use only the two experimental DUI levels because the non-DUI alcoholics were not administered the Mortimer-Filkins test.

The results of the discriminant analysis are shown in Table 16. Wilks' lambda indicates the groups are significantly different on the discriminating variables ($p < .001$). The canonical coefficient included in the solution was .55. The standardized canonical discriminant function coefficients and the structure coefficients are also shown in Table 16. The absolute value of these coefficients indicates which variables contribute most to determining the scores on the function.

As mentioned earlier, the factors from the three factor solution have a very low correlation, but the Mortimer-Filkins score is correlated highly with the Alcohol factor ($r = .53$). The structure coefficient, therefore, provides a better measure than the standardized coefficient, of which variables contribute most to determining the scores on the function. The following unstandardized canonical discriminant function coefficients can be used to create a formula to predict group membership: Alcohol (.18),

Table 16

Stepwise Discriminant Analysis of the Mortimer-Filkins and Three Factor Scores by Two DUI Levels

Variable	Step Entered	Wilks' λ at Step Entered	F	Standardized Coefficient[a]	Structure Coefficient
Mortimer-Filkins	1	.72	88.56*	.91	.93
IMP/SS	2	.71	47.31*	-.27	-.17
Psych Distress	3	.70	32.98*	.19[b]	-.02[b]
Alcohol	4	.70	25.08*	.16	.64

[a] Standardized canonical discriminant function coefficients in final equation.
[b] Transformed score - reverse sign for correct direction.
* $p < .001$.

Psychological Distress (.23), Impulsivity/sensation-seeking (-.28), Mortimer-Filkins (.034) and the constant (-2.02). Using this formula resulted in correct classification of 77.02% of the cases. Since the sample sizes are equal and there are two groups, classification by chance would yield 50%. Thus, there was a 54% improvement over chance by using the discriminant analysis procedure. The two group analysis using the three factor scores and *not* the Mortimer-Filkins score resulted in 68.07% of the cases correctly classified, representing an improvement of 34% over chance.

The classification results for the analysis using the Mortimer-Filkins test are shown in Table 17 and can be grouped into high and low risk cases just as in the case for Exploratory Research Question 2. In this case, a high risk first time offender would actually be a member of the first time offenders' group but would be predicted to be a member of the recidivists' group. A low risk first time offender would be predicted to be a member of the same group he actually is assigned to. In the same manner, a low risk repeat offender would actually be assigned to the recidivists' group and would be predicted to belong to the recidivists' group. Using the two group comparison, it is a mute point to identify high risk recidivists since they already belong to the highest group.

Table 17

Discriminant Analysis Group Classification Results for Two DUI Levels

		Predicted Group	
Actual DUI Level	n	(2)	(3)
First Time Offenders (2)	118	97[a] 82.2%	21[b] 17.8%
Recidivists (3)	117	33 28.2%	84[a] 71.8%

[a] Low risk - occurs when the predicted group is the same as the actual group.
[b] High risk - occurs when the predicted group is higher than the actual group.
Note. Total correctly classified = 77.02%.

As an additional comparison, it is useful to examine the frequencies of the Mortimer-Filkins scores using the three classification levels established by that test instrument. These are shown in Table 18.

Table 18

Percent of Cases Classified by the Mortimer-Filkins Test Using the Three Classification Levels Established by that Test Instrument, by Group

Drinking Level	First Time Offender	Recidivist	Total
Non-problem Drinker	7.6%	0%	3.8%
Presumptive Problem Drinker	12.6%	4.3%	8.5%
Problem Drinker	79.8%	95.7%	87.7%

Additional Analyses

Two final analyses were completed to provide information about the contribution of variables in the discriminant analysis procedure. The first analysis was completed to demonstrate which specific variables stepped into the discriminant analysis when using the stepwise procedure with the individual variables rather than the factor scores. Although the factor scores eliminate problems with collinearity, the individual importance of each variable is lost. Table 19 shows the variables that met the minimum F-to-enter criterion of 1.00 and were entered into the discriminant analysis solution. The Mortimer-Filkins test was not attempted because the non-DUI alcoholics did not have a score on this measure.

Table 19

Specific Measurement Scales that Entered into the Stepwise Discriminant Analysis When All Scales Were Attempted

Variable	Step Entered	Wilks' λ at Step Entered	F	p
MAST	1	.69	62.73	<.001
SCL Anxiety Scale	2	.59	42.36	<.001
Impulsivity Scale	3	.58	29.71	<.001
SCL Psychopathy Scale	4	.56	23.18	<.001
DUSI Behavior Scale	5	.55	18.94	<.001

Note. F-to-enter criterion = 1.00.

The second analysis attempted to identify the factor score that contributed most to the correct classification of cases. Even though the standardized and unstandardized canonical discriminant function coefficients are useful to determine which variables contribute the most to the solution, there is no reported significance level for the incremental change in Wilks' lambda. To observe the change in correct classification the discriminant analysis procedure was employed for each factor, separately, and for each combination of factors. The results are shown in Table 20.

Table 20

Percent of Cases Correctly Classified Using Individual Factor Scores or Various Combinations of Factors With 2 and 3 Groups

	% of Cases Correctly Classified	
Measure	2 Group	3 Group
Alcohol, Psych Distress, Impulsivity/sensation-seeking	67.08%	56.95%
Alcohol, Psych Distress	66.26%	58.98%
Alcohol, Impulsivity/sensation-seeking	67.08%	50.51%
Psych Distress, Impulsivity/sensation-seeking	48.97%[a]	43.73%
Alcohol	66.26%	49.49%
Psych Distress	47.74%[b]	41.69%
Impulsivity/sensation-seeking	48.97%[a]	31.86%

[a] Wilks $\lambda = .16$; F-to-enter > 1.00.

[b] Wilks λ ns.

Chapter 6

Discussion

The intent of the study was to explore the psychosocial profile of the DUI offender from the Problem-Behavior perspective that multiple factors contribute to the elucidation of any particular problem behavior - in this case, driving under the influence. The study examined responses to a questionnaire presented to three different male DUI level groups, including non-DUI alcoholics, first time offenders, and DUI recidivists. Differentiation between first time offenders and recidivists on a number of psychosocial and behavioral characteristics was attempted, using the non-DUI alcoholics as a comparison group. In particular, the relationship between alcoholism, several types of psychopathology, and sensation-seeking behavior was assessed to determine whether this had any predictive ability regarding repeat DUI behavior. The use of the non-DUI alcoholics as a comparison group allows us to examine differences beyond alcoholism that contribute to DUI behavior. The fact that many DUI offenders have an alcohol problem is not surprising, but it is interesting that all alcoholics do not commit DUI offenses. This points to factors beyond alcoholism that contribute to the DUI behavior.

Discussion of the Psychometric Procedures

The most logical factor structure that emerged was obtained by forcing a third factor from the solution by accepting an eigenvalue of .8. While this value is below the traditionally accepted cut-off point of 1.00, it results in a factor structure that clusters the variables into meaningful constructs. The two factor solution grouped the two alcohol scales as well as the impulsivity and sensation-seeking scales together. This was not consonant with the study purpose which was to examine alcohol issues separate from impulsivity and sensation-seeking. On the three factor solution, however, the variables loaded nicely on the appropriate factors, addressing Psychological Distress, Alcohol Problems, and Impulsivity/sensation-seeking. These factors could now be subjected to the discriminant analysis and multiple regression procedures to determine which, if any, helped discriminate between DUI levels and which constructs contributed to the DUI behavior.

Discussion of the Results on the First Hypothesis

The first hypothesis states that "non-DUI alcoholics and recidivists will score higher on measures of alcoholism than first time offenders." The results, in fact, support the hypothesis with significant differences between all three groups in the hypothesized direction. The mean scores for the three levels are also as expected. Using a cutoff score of ≥ 12 on the MAST as a measure of alcoholism, the results show that all the non-DUI alcoholics meet the criteria* for alcoholism; about one-third of the first time offenders meet the criteria and about three-fourths of the recidivists meet the criteria.

These results tend to support the contention that first time offenders do not commit DUI's solely because of alcohol problems since a majority of them do not demonstrate serious alcohol problems as measured by the MAST. Other factors, as indicated in the previous research, then, must contribute to the reasons for the DUI offense. Certainly, a variety of circumstances may contribute but it is also possible that a pattern of behaviors or characteristics is present, supporting the Problem-Behavior Theory notion. The possibility that these include psychological characteristics and impulsivity or sensation-seeking behaviors was tested in the discriminant analysis procedure and will be discussed later in this section.

The results also lead us to presume that the role of alcohol is more significant with recidivists since three fourths of those respondents demonstrate a problem with alcohol as measured by the MAST. The comparison group of non-DUI alcoholics, however, shows us that alcohol problems are not the only factor contributing to the DUI behavior because they have significantly more alcohol problems than even the recidivists, but they have not had a DUI offense. This, again, points to the presence of other behaviors or characteristics that may be responsible for the DUI offense. As surmised earlier, this is consistent with the Problem-Behavior perspective that multiple behaviors or characteristics contribute to problem behaviors such as DUI.

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* The non-DUI alcoholics were actually prescreened by this criteria. They were excluded from the sample if they did not score at least 12 on the MAST.

A final comparison between the first time offenders and the recidivists, using the Mortimer-Filkins test, showed that the recidivists again scored significantly higher. This result is consistent when compared with the MAST as well as the MacAndrews test. It deviates, however, in magnitude. A much higher percentage of first time offenders and recidivists were rated as problem drinkers (the highest category) on the Mortimer-Filkins than on the MAST or the MacAndrews. This indicates that the Mortimer-Filkins is suitable to differentiate first time offenders from recidivists on a measure of alcohol use, but its cutoff point for problem drinkers may be set too low. This results in a higher number of Type I errors (false positives) and creates difficulty for agencies to determine which clients are truly in need of more intense treatment because it rates most offenders in the most serious category. That is, it is less cost effective to provide more treatment to individuals who may not need it nor benefit from it.

The results for testing the first hypothesis are affected by two potential sources of error. The first is that the reliability score obtained for the MacAndrews test is very low, bringing into question the suitability of the MacAndrews test. To this question we look to the previous literature for reassurance. The MacAndrews is a well established instrument with dozens of validation studies attesting to its construct and concurrent validity. None of the known studies have questioned its ability to produce consistent results over time, except that it may be subject to fluctuations in an individual's mood which could affect the scores on repeat administrations. In addition, the MacAndrews responded as predicted on the factor analysis, loading on the same factor as the MAST. It also correlates highly with the MAST. With this positive history of validation studies and findings in this study, we can accept the results of the MacAndrews test with reasonable confidence.

The second potential source of error is found in the heterogeneity of variance found with the distribution of scores on the Mortimer-Filkins test. This heterogeneity was moderate rather than severe and the sample sizes of the first time offenders and the recidivists were identical. Under these circumstances, the ANOVA test is not particularly sensitive to the violation of homogeneity of variance (Norusis, 1990). With this second reassurance, we can be reasonably comfortable accepting the analysis results.

Discussion of the Results of the Second Hypothesis

The second hypothesis states that "recidivists and non-DUI alcoholics will score higher on measures of psychopathology than first time offenders. Recidivists will score highest on these measures." The differences between the groups were only partially in the hypothesized direction. The results reveal that the non-DUI alcoholics, rather than the recidivists, scored highest on measures of psychopathology. As hypothesized, the non-DUI alcoholics scored higher than the first time offenders. The results were consistent across the eight scales and one factor score that were used to measure psychopathology. In the three group analysis, there was, in fact, no significant difference between the recidivists and the first time offenders, although the recidivists consistently had higher (but not significantly higher) scores on all the measures. The second hypothesis is supported, then, only in the sense that the first time offenders had the lowest mean scores on the measures of psychopathology, even though these scores were not significantly lower than the recidivists' scores.

Since differences were not found in the hypothesized direction, a follow-up means comparison between the first time offenders and the recidivists was conducted to explicate the disconfirmation of the hypothesis. In this case only the results of the Beck

Depression Inventory showed significant differences. All the remaining scales continued to show no significant differences between the scores.

From these analyses, it must be concluded that the DUI levels do not differ in the hypothesized direction on measures of psychopathology. The fact that differences do exist means that this information, however, remains useful and will be discussed further in the discriminant analysis section where the discriminating ability of the variables will be demonstrated.

The rationale for the hypothesized differences in psychopathology hinged on one aspect of Problem-Behavior Theory that pointed to a cluster of problem behaviors associated with an outcome problem such as DUI. In this regard, DUI recidivists were seen as individuals with a strong likelihood of having an alcohol problem, but also experiencing other life problems that may exacerbate the alcohol problem and subsequently result in a DUI situation. This perspective is shared by McMillan, et al. (1992) in their study comparing first time offenders and multiple offenders. They found that recidivists scored significantly higher than first time offenders on measures of hostility, sensation-seeking, psychopathic deviance, mania and depression and that recidivists displayed personality traits and behaviors that were different from alcohol abusers in general. In the present study, non-DUI alcoholics, on the other hand, were seen as being at least stable enough to avoid the problems that DUI brings. Thus, in this one respect, they were seen as more stable and likely to score lower on measures of psychopathology.

This, apparently, is where the association ends, however. In the formulation of the hypothesis it may have been somewhat short-sighted to presuppose that non-DUI alcoholics did not also experience many other psychological problems that would result in high scores on the psychopathology measures. The literature is well documented with examples of the social and psychological problems that compound the lives of alcoholics (Mercier, et al., 1992; Sobieraj & Hollyfield, 1987 & Derogatis, et al., 1973). It may be more practical to accept that the non-DUI alcoholics experience more psychological problems than DUI offenders but have been able to avoid DUI problems through drinking patterns that do not involve driving, rare cases of good planning, or even simply through good luck.

Having discussed the nature of the results, it must be noted that a substantial and apparently uncorrectable heterogeneity of variance on the SCL scales casts some doubt on the validity of the results in this section. After reciprocal transformation, improvement was shown in the Beck scales and the DUSI Psychiatry scale, but not in the five SCL 90-R scales. The t-test with separate variance estimate corrects for heterogeneity of variance and the similar results from this additional test were used to strengthen our confidence in the initial analysis. We could then continue the analysis with confidence that the heterogeneity of variance would not substantially invalidate the results.

Another encouraging indicator was that, except for the SCL Depression scale, the variances were quite homogeneous on the two group comparison between the first time offenders and the recidivists. This points to the non-DUI alcoholics' group as the source of the heterogeneity. Thus, results that include this group should be interpreted with caution, while more confidence can be maintained with any analyses involving the first time offender and recidivists' groups.

To conclude, the second hypothesis was disproven and results reveal that non-DUI alcoholics score significantly higher than recidivists or first time offenders on measures of psychopathology. The results further reveal that recidivists consistently have higher mean scores than the first time offenders, but the recidivists' scores were not significantly higher than the first time offenders' scores. These results are not supported by the findings from previous research and lend little support to the Problem-Behavior Theory concept that would predict recidivists to demonstrate more problem behaviors than first time offenders.

Discussion of the Results of the Third Hypothesis

The third hypothesis states that "recidivists will show the highest levels of impulsivity, sensation-seeking, and anti-social behavior. Non-DUI alcoholics will show the lowest levels of these variables." The results of the one-way analysis of variance with the Student-Newman-Keuls test disprove the hypothesis. The outcome, in fact, was virtually opposite that which was hypothesized. In all cases, the non-DUI alcoholics scored highest instead of lowest on measures of impulsivity, sensation-seeking and acting out behavior. The recidivists scored the lowest or not significantly different from the lowest on all the measures and there were no significant differences between the first time offenders and the recidivists.

These results are further supported using the measure of the number of times DUI per year but not caught. Any instance of driving under the influence, regardless of being caught, could be viewed as one form of impulsive or acting out behavior. In this case, the relationship remains the same, with the non-DUI alcoholics scoring significantly higher than the first time offenders and the recidivists. Following the same logic of the hypothesis, the recidivists would have been expected to drive the most times under the influence regardless of being caught. While the recidivists drove under the influence more, on average, than the first time offenders, the difference, like that in the primary hypothesis test, was not significant.

These results are not consistent with other related studies. Several studies applying Problem-Behavior Theory to the DUI problem point to heightened levels of impulsivity, sensation-seeking and aggressive behavior in DUI recidivists (Wilson, 1991; Wilson & Jonah, 1988; & Donovan, 1983). Johnson & White (1989) reported that sensation-seekers, risk takers and impulsive individuals will drive impaired more often. Little & Robinson (1989) found that multiple problem behaviors, including sensation-seeking, contributed to DUI recidivism. These studies leave little doubt that DUI offenders as a whole, and especially DUI recidivists, display high levels of these variables. Other accounts, however, point to impulsivity and acting out behavior in alcoholics, regardless of their DUI history (Miller & Hester, 1980; Milt 1976), indicating that this group of individuals also may display multiple problem behaviors.

None of the studies reviewed in the literature, however, directly compared DUI offenders (first time and recidivists) with non-DUI alcoholics on these variables. Given the prior research, it is conceivable that all three groups display heightened impulsive or sensation-seeking behavior relative to the general population, but the non-DUI alcoholics display extremely heightened levels. Examination of the mean scores on the Sensation-seeking Scale reveals that although the non-DUI alcoholics scored significantly higher than the other two groups, there is still a heightened level of sensation-seeking behavior shown in the first time offenders and the recidivists. This supports findings in the literature that reveal elevated levels of sensation-seeking behavior in DUI offenders. On the Impulsivity Scale and the DUSI Behavior Scale, however, the first time offenders and the recidivists scored in the moderate range with the recidivists scoring higher on both, but not significantly higher.

Retrospectively, it is not difficult to understand the higher scores by the non-DUI alcoholics on these measures, especially when considering that these alcoholics are in treatment and perhaps more willing to acknowledge their shortcomings. Earlier, we discussed the presence of impulsive and acting out behavior in alcoholics. It is surprising, however, that the recidivists did not score significantly higher than the first time offenders on these measures. In fact, they did not score significantly higher than the first time offenders on the self-reported measure of driving under the influence regardless of being caught, although the recidivists' mean scores were higher than those of the first time offenders'. This may lead to the conclusion that measures of impulsivity and sensation-seeking are not good measures to discriminate first time offenders from recidivists. It would be interesting to compare scores on these measures between DUI offenders as a whole and the general population of drivers.

To conclude, the comparison of scores in these three groups on this set of variables reveals that impulsivity, sensation-seeking and acting out behavior can differentiate non-DUI alcoholics from DUI offenders, but does not differentiate well among DUI offenders. The direction of the effects was in opposition to that indicated by the hypothesis, which proposed that the recidivists would score the highest on these measures. While the direction of the scores was not as hypothesized, the comparison provides new information about the relationship among the groups on these variables. This relationship will be tested further in the discriminant analysis portion of this study. Any implications for practice will be discussed at that time.

Discussion of the First Exploratory Question

The exploratory questions, especially the first two, form the basis of this study. The first question asks, "Can we differentiate first time DUI offenders into high and low risk groups by observing the characteristics of a sample of first time offenders, recidivists, and non-DUI alcoholics? If so, can we apply the same process to identify first time offenders who may be high risk to repeat the DUI offense at some point in the future."

The presumption in this question is that there are differences in certain characteristics, traits, or behaviors among the three study groups and that these differences can be used to differentiate the members into predicted groups. By observing scores for a number of members of a given group, the discriminate analysis procedure identifies a range for each group so that members can be properly categorized. Using the three factor scores derived in the factor analysis and subjecting them to the discriminant analysis procedure, we can identify which members are in the appropriate group and which ones manifest behaviors or characteristics that are not within the norms of their actual group. The advantage of using factor scores is that a number of intercorrelated variables is reduced to a few specific factors, thus minimizing potential problems with multicollinearity.

A word about Problem-Behavior Theory is useful at this point. The theory, as we recall, posits that a cluster of characteristics and behaviors are responsible for the elucidation of various problem behaviors in individuals. By identifying the critical characteristics or behaviors, we can explain why some types of individuals are involved in certain types of behaviors, such as DUI. The challenge is to identify the correct combination of variables that best explains the problem behavior.

We use past research to progress from this point. The literature review provides evidence of a wide variety of characteristics and behaviors that are related to DUI. These were essentially grouped into the three categories which are represented by the factor scores identified in this study, including Psychological Distress, Alcohol problems and Impulsivity/sensation-seeking behavior. It was felt that some combination of the variables representing these three factors could explain the differences among the non-DUI alcoholics, the first time offenders, and the recidivists and thus provide the basis for correctly categorizing these individuals.

The results of the hypothesis testing can be useful even though the results were not in the hypothesized direction. The testing identified that differences on these variables did, in fact, exist and even though the univariate testing shows that the non-DUI alcoholics were substantially different from the first time offenders and recidivists, the discriminant function analysis gives us a test for total discriminability. In this sense, we can benefit from the discriminant function analysis even though the differences were not in the hypothesized direction on Psychological Distress and Impulsivity/sensation-seeking and there were no significant differences between the first time offenders and the recidivists on these two variables. Hair (1989) supports the contention that we cannot always predict the outcome of the discriminant function analysis based solely on the univariate results.

The findings on the first exploratory question indicate that we can, indeed, differentiate first time offenders into high and low risk groups based on the three factor scores, at a better than chance rate. We can also identify first time offenders who are high risk to repeat the offense at some time in the future.

The solution from the three group discriminant analysis contained, of course, two discriminant functions. Each function describes differences among the variables along different dimensions. The eigenvalue of the first function indicates that it is the most powerful discriminator, accounting for the majority (83%) of the explained variance. Even so, the second function was found to contribute significantly to the discrimination among the groups and was used in the formula to predict group membership. This is supported by the value on the canonical correlation coefficient, which indicates that the groups are quite different on the first discriminant function. It also shows there is a moderate difference among the groups on the second function. The highly significant Wilks' lambda in this study indicates that there are differences among the group centroids and that the three factors can be effectively used as discriminating variables.

In this study the percentage of cases correctly classified was substantially larger (55.2%) than that which might be obtained by chance. Hair (1989) indicates that the chance rate can be determined using the proportional chance criterion and classifications that exceed 25% of those that could be expected by chance indicate the discriminant analysis has provided a useful solution.

Table 13, in the results section, provides a summary of the classification results and shows that about two-thirds of the non-DUI alcoholics and first time offenders and about half of the recidivists were correctly classified. From a practical perspective, however, we are more interested in the respondents who were not correctly classified. That is, those who were predicted to be in a group other than the actual group. We can focus on these respondents as high or low risk to have future problems with DUI. In particular, a first time offender who is predicted to be a recidivist is high risk because they present with the characteristics and behaviors that typify a recidivist. Possessing these characteristics does not guarantee that the respondent will be a recidivist. Rather, it suggests that the individual is more likely to be a recidivist because of the way they cope with problems, use alcohol, and respond to various stimuli (regarding impulsivity or sensation-seeking).

It follows that a first time offender who is predicted to be a non-DUI alcoholic is also high risk. Certainly, they cannot become a *non-DUI* alcoholic because they have already committed one DUI offense. However, they are high risk because they display a profile that is similar to others with an alcohol problem and this should be cause for concern. Finally, a first time offender who is predicted to be a first time offender is low risk. In this case the individual is classified correctly and the DUI agency can presume that they can follow the prescribed program for individuals of this type.

In the case of the recidivists, a high risk individual would be predicted to be a member of the non-DUI alcoholic group. They would be considered high risk because they not only have had multiple DUI offenses, but they display the characteristics of an alcoholic. This scenario could result in future DUI's or other alcohol related problems.

The low risk recidivist would be predicted to be in the recidivists' group. While it may be somewhat of a contradiction to consider any recidivists at low risk, the term is used relative to the agency's perspective. The recidivist has entered the agency already identified as a repeat offender. The purpose of the discriminant analysis classification is to learn whether the offender is any different from what we already know. From this perspective, we can justify the idea of low risk recidivists as ones who are no different than what is already known about them.

In this description we have intentionally omitted a high or low risk classification for the recidivist who is predicted to be a first time offender. From a practical point of view, this case is an anomaly. While the recidivist may display the characteristics of a first time offender, they have already demonstrated their lack of judgment by obtaining a second or subsequent DUI and must receive treatment or education commensurate with the offense. As a default, they could be considered low risk just as is the correctly classified recidivist.

A word of caution must be interjected here. Our interpretation of high risk individuals derives from observation of those cases which were *not* correctly classified through the discriminant function analysis. In a sense, we are attaching meaning to the residual or error component of the analysis. While this is not completely inappropriate, we must exercise caution with this interpretation because the residuals may represent other unknown factors. This will be discussed more in the section on "Limitations to the Study".

The final part of the exploratory research question asks if we can apply the discriminate analysis process to other first time offenders to determine whether they may be high risk to become a future recidivist. The technical answer to this question is "yes, but with some difficulty." While our sample was sufficiently large for study purposes, it should be substantially larger to establish normative results. The results should also be cross validated with split half samples and subjected to further statistical tests to ensure their accuracy. Theoretically, if this were accomplished, we could use the results of the study as normative data and simply enter a future individual's scores into the discriminant function formula that was derived from the unstandardized discriminant function coefficients to determine the predicted group. Based on the classification, the individual would be determined to be high or low risk and would be channeled by the agency into the appropriate treatment or education.

An additional discriminant analysis procedure was conducted to ensure that the results were the same under different circumstances. This involved running the discriminant analysis procedure using only the two DUI offense groups (excluding the non-DUI alcoholics). This was done to address the absolute differences between first time offenders and recidivists without considering the effects of the non-DUI alcoholic group. The results reveal that Wilks' lambda maintained its high level of significance and the canonical correlation coefficient also remained high. The classification results were very similar, with 66.67% classified correctly. The distribution of high and low risk was also very similar. Appropriately, those cases classified as non-DUI alcoholics in the three group solution, were almost all regrouped into the recidivists' group in the two group solution. The only difference between the two solutions was the contribution of the discriminating variables. This will be discussed in the following section on the second exploratory research question. From this test we can conclude that the discriminant analysis procedure is satisfactory to use with two or three groups.

As discussed, the factor solution was preferable to entering specific variables into the discriminant function analysis. However, because we lose the relative importance of each measure when doing this, an additional analysis was conducted. This showed that the MAST scale, followed by SCL Anxiety, SCL Psychopathy, Impulsivity Scale, and DUSI Behavior Scale were stepped into the discriminant function analysis in that order. This information is not necessarily related to the results of our study, but provides useful information to readers interested in the role of specific scales related to the study.

Discussion of the Second Exploratory Question

The second exploratory question is an extension of the first and asks, "Within the purview of the study variables, can we identify those variables that contribute most accurately to the assignment of group membership?" From a practical point of view, the answer to this question should contribute greatly to the criteria used when developing a treatment or education plan in a DUI program. Earlier in this study, it was reported that many DUI treatment programs focus heavily on alcohol as the primary contributor to DUI behavior. Consequently, the treatment and education programs contain a heavy alcohol awareness or treatment component. It was also mentioned that this emphasis on alcohol is not necessarily inappropriate. The results of this study, however, point to *adding* information or treatment about psychological factors and impulsivity and sensation-seeking to the curriculum rather than *replacing* the alcohol orientation of the program.

The relative importance of the variables can be obtained through the discriminant analysis and this can be used by the agency to determine the amount of time and resources to devote to each variable that impacts the DUI behavior. Specifically, the standardized discriminant function coefficients tell us which variables contribute to determining the scores on each function and how much each variable contributes. This valuable information can be used in conjunction with the classification data to determine whether an individual belongs in a high or a low risk group and what the nature of the curriculum should be in that class.

We recall that the first function in the three group analysis accounted for 83.75% of the explained variance among the groups. On this function, Psychological Distress was the strongest discriminator, rating just ahead of the Alcohol factor. The Impulsivity/sensation-seeking factor was the weakest discriminator but still contributed a meaningful amount of the explained variance as indicated by its meeting the minimum F-to-enter criterion of 1.0. When considering the full value of the discriminant analysis, we must also consider the composition of the variables in the second function because it also had a significant Wilks' lambda even though its eigenvalue indicated it accounted for a much smaller portion of the variance. In this case, Alcohol is the strongest contributor, followed by Psychological Distress and more closely by Impulsivity/sensation-seeking. Taken together, these results point to Alcohol and Psychological Distress as approximately equal in their ability to discriminate among members of the three groups, with Impulsivity/sensation-seeking providing a smaller, but important amount of discriminating ability.

Although the significance levels and classification results of the three group and two group analysis were very similar, we must report that the contribution of the variables in the two group analysis was different. The three group analysis was discussed above. In the two group analysis, Alcohol was, by far, the strongest discriminator, followed by Impulsivity/sensation-seeking. The contribution of Psychological distress was very low in the discrimination of only first time offenders and recidivists.

Unlike multiple regression analysis, which reports the significance of the incremental change when additional variables are added to the analysis, in discriminant analysis we are limited to observation in the actual change in Wilks' lambda after each step. This provides only an approximation of the contribution of each variable. Wilks' lambda is significant after each of the three factor scores are entered, but the change in Wilks' lambda is rather small with the addition of Impulsivity/sensation-seeking. The results indicate that the percent of cases correctly classified is optimized when the factors Alcohol and Psychological Distress are stepped into the equation without stepping in Impulsivity/sensation-seeking. Although the optimization is only a 2% improvement on the percent of cases correctly classified, it is interesting that there is an improvement when removing a variable.

When analyzing the solution purely from a mathematical perspective, we should eliminate the Impulsivity/sensation-seeking factor. However, several intuitive reasons support keeping it in the solution. First, past research documents an association between DUI behavior and impulsivity and sensation-seeking (Donovan, et al., 1988; Horvath, et al., 1993). In the absence of a specific reason not to include it, this conservatively supports keeping it. Second, although the canonical coefficients indicate the contribution is small in the first function of the discriminant analysis, it is substantially larger for the second function. This indicates that Impulsivity/sensation-seeking imparts some discriminating ability to the analysis. Third, the introduction of this variable adds a component that is not portrayed by measures of alcohol use or psychopathology. Impulsivity and sensation-seeking are non-pathological personality traits that can have an influence on human behavior. Full understanding of DUI behavior requires an examination of the full range of behaviors and characteristics that influence it. Fourth, when using discriminant function analysis on the actual scales, the Impulsivity scale was one of five of the 12 scales to survive the stepwise inclusion into the solution. Finally, measurement of this variable is easy and requires little time. With a small investment in time, useful information about the offender is obtained. The contrast between using the pure mathematical solution which would eliminate Impulsivity/sensation-seeking, and the intuitive approach, which supports its inclusion, leaves us with the need to test this variable further to determine its true impact, if any.

In summary, then, Alcohol and Psychological Distress are the variables that are most helpful in correct group classification. Impulsivity/sensation-seeking has not been shown to be statistically helpful but may add a useful dimension to the understanding of DUI behavior.

Discussion of the Third Exploratory Question

The third explanatory question asks, "What characteristics are associated with individuals who frequently drive under the influence, regardless of whether they are caught?" This question cuts to the true issue of *actually* driving under the influence rather than the legal issue which deals with getting *caught* driving under the influence. In the absolute sense we are concerned about the characteristics and behaviors that contribute to any episode of driving under the influence. Getting caught is strictly a legal extension that follows some episodes of driving under the influence. In this sense one may argue that a measurement of the characteristics of individuals who drive under the influence frequently provides more useful information than a measure of the characteristics of only those who were caught.

Past research has focused almost exclusively on the (caught) DUI offender rather than the number of times an individual had driven under the influence regardless of being caught. Only two studies were found that addressed the latter variable (McMillen et al., 1991 & Johnson & White, 1989).

This measure did, however, yield what the interviewer felt was a reasonable account of the number of times an individual drove under the influence in the past 12 months. These data, when log transformed, became the dependent variable for the stepwise multiple regression analysis. The three factor scores were entered as the independent variables.

The results of the stepwise multiple regression analysis reveal that the three factors are somewhat successful predicting the number of times an individual drives under the influence. In order of importance, based on the beta, the variables that predict the times DUI are Alcohol problems, Psychological Distress and Impulsivity/sensation-seeking. All these variables provided a significant contribution to the prediction of the times DUI. Race was forced into this analysis and the results indicate it can be ruled out as a confounder.

A two group regression analysis omitting the non-DUI alcoholic group was performed and yielded virtually the same results. The contribution of the independent variables was almost the same, except that Impulsivity/sensation-seeking contributed slightly more. Alcohol continued to contribute the most while Psychological Distress contributed the least, but still a significant amount.

The results in this section further support the Problem-Behavior Theory notion that a cluster of characteristics or behaviors is more effective explaining a problem behavior. When considering Alcohol alone, the amount of variance accounted for in the number of times DUI is 9.5%. This increases to 13.9% when adding the other two factor variables. In both cases, the contribution of these variables was significant. By looking at a cluster of variables, then, agencies may be more effective addressing the factors that contribute to the driving under the influence behavior.

It is also encouraging to learn from this analysis that the same variables that were found useful in the discriminant analysis could be applied in the more general case of driving under the influence but not caught. This information should be useful to agencies when developing treatment plans. From this perspective, the focus for treatment should remain on alcohol, with briefer components on impulsivity, sensation-seeking and psychological factors. It is interesting in this analysis that impulsivity and sensation-seeking played a slightly more significant role than psychological factors. It points to the thrills or impulsivity component that may be present in repeated cases of driving under the influence regardless of being caught.

Discussion of the Fourth Exploratory Question

The fourth exploratory question asks, "Do Mortimer-Filkins test scores correspond with other measures associated with high risk offenders that are identified in this study?" The Mortimer-Filkins test holds the distinction of being one of the most widely used instruments for evaluating DUI offenders, but also one that is highly questioned for its ability to identify high and low risk DUI offenders (Mischke & Venneri, 1987; Voytko, 1993; Webb, 1990; & Webb, et al., 1992). In particular, it has been criticized for having a high number of Type I (false positive) errors when evaluating DUI offenders. The cutoff points are too low and, consequently, individuals who may not have an alcohol problem are identified as problem drinkers. This limits agencies' ability to use the Mortimer-Filkins test to accurately place individuals into appropriate treatment based on their needs and demonstrated problem with alcohol. It should be mentioned that the test minimizes denial through disguised questions and measures alcohol use as well as other variables that are known to correlate with alcohol problems, including marital problems, financial difficulty, legal problems and neuroticism.

To explore this question, the Mortimer-Filkins score was entered into the discriminant analysis procedure with the three factor scores. Naturally, this was a two group comparison because the non-DUI alcoholics did not have a Mortimer-Filkins score. The results of the analysis show that the Mortimer-Filkins test improves the correct classification of cases by 10% when it is added to the solution. The rate of improvement over that which would be expected by chance improves by 20%. This supports the notion that the Mortimer-Filkins is a good discriminator between first time offenders and recidivists.

Normally, the standardized canonical discriminant function coefficients determine which variables contribute the most to determining scores on a function. By observing these coefficients, the results would seem to indicate that the Mortimer-Filkins score contributes substantially more than any other variables to assigning group membership. However, because the Mortimer-Filkins score correlates highly with that of the Alcohol factor (r = .53) the structure coefficients provide a better indication of the contribution of the variable (Klecka, 1980). This is true because the structure coefficients are simple bivariate correlations and therefore not affected by relationships with other variables. In this case the Mortimer-Filkins test continues to contribute substantially, but the contribution of Alcohol is also very high, pointing to two strong measures of alcoholism describing this function.

The issue of the low cutoff scores remains to be discussed, however. While the Mortimer-Filkins improves discrimination among groups, its cutoff scores seem to indicate little ability to differentiate among non-problem drinkers and more serious problem drinkers. Indeed, 80% of the first time offenders and 96% of the recidivists were grouped as problem drinkers and another 12% of the first time offenders and 4% of the recidivists were grouped as presumptive problem drinkers. This seems to indicate that agencies should provide treatment to virtually all DUI offenders, rather than identifying some as needing only education. In contrast to the Mortimer-Filkins cutoff scores, the MAST identifies 32% of the first time offenders as problem drinkers and 75% of the recidivists as problem drinkers.

Because the Mortimer-Filkins test shows good discriminating ability, the logical recommendation is to adjust the cutoff scores upward. Additional testing would be necessary to determine the optimum levels and this could be accomplished by comparing actual Mortimer-Filkins scores with actual and predicted group membership classification. This would result in an instrument that could classify cases for the agency as well as give an indication of the level of treatment that is needed. In a nutshell, it means using the Mortimer-Filkins as a continuous scale score rather than a categorical group score.

Discussion of Ancillary Information

Respondents provided information about numerous aspects of their background and driving history. While much of this will provide information for future studies on this data set, there were some interesting observations that added to this study. These will be discussed in the following section.

The issue of prior drug and alcohol or mental health treatment was measured to determine whether DUI offenders are reasonably aware of their problems or whether they may be unaware of the problems and cope with problem situations inappropriately by self-medicating with drugs or alcohol. There were limitations to the actual data collected in that the specific question was posed as a yes/no item, with no opportunity for the respondent to clarify or provide a number of times treatment had occurred. However, the differences between the groups are noteworthy. The fact that non-DUI alcoholics received prior drug or alcohol treatment significantly more than the DUI groups is no surprise, but it is interesting that the recidivists had significantly more treatment than the first time offenders. We can only speculate whether this treatment consists of the more traditional voluntary outpatient drug and alcohol treatment, or whether it is forced compliance DUI drug and alcohol education and treatment. In any event, it is some form of treatment, and a simple measure of its effectiveness, or lack thereof, is found in the recidivists' repeat episode. This points to the possibility that other factors, that were not addressed in the treatment, contribute to the repeat DUI offense.

On the prior mental health treatment issue, there was a significant difference between the non-DUI alcoholics and the DUI offenders, but not between the first time offenders and the recidivists. There is little to evaluate in this situation. While it is possible that both DUI groups have experienced mental health problems and have chosen to self-medicate with alcohol rather than seek treatment, we cannot determine this with the available data. This issue is left for further exploration.

Limitations of the Study

Generalizability of the results are limited by the size and distribution of the sample. The size and disproportionate race distribution of the non-DUI alcoholic sample may be cause for concern. 'The sample size was slightly less than the desired size even after the time period for data collection was extended by several weeks. The number of individuals in the alcohol treatment programs at both agencies was underestimated, leading to the shortfall. It is likely the substantial size variation between the non-DUI alcoholics' group and the DUI groups contributed to a less than perfect statistical analysis. For instance, heterogeneity of variances was an issue when using the one-way ANOVA. This problem would have been reduced had the sample sizes been approximately equal. Likewise, some improvement on the percent of correctly classified cases in the discriminant analysis may have been observed with equal sample size.

The non-DUI alcoholic group was also heavily weighted with African-American respondents. This distribution was not present in the other two samples, creating the possibility of a confounding variable. A number of safeguards were undertaken to ensure that any discriminating or predicting ability in the variables was due to their distinct characteristics and not to differences in race.

First, although significant differences are apparent on race when comparing the three study groups, this difference disappears on a two group comparison including the first time offenders and the recidivists. Therefore, race will not act as a confounder in any statistical comparison involving only the first time offenders and recidivists.

The second measure involved using a t-test comparison of the means of several scales employed in the study. Because the non-DUI alcoholics were the suspect group with the disproportional race composition, they were compared with the combined first time offenders and the recidivists. The test was first conducted with the entire samples and then, again, without the African-Americans. For the most part, the results support the contention that race is not a confounding variable. Although the SCL Paranoid scale showed some change in significance level, it remained marginally significant at the .10 level. Likewise, although the Impulsivity/sensation-seeking factor was no longer significant after excluding the African-Americans, the amount of significance that was lost was not considered substantial. Even with these two cases, the absence of any appreciable change due to race on the remaining 13 scales allows us to accept the differences among the groups on race as inconsequential.

The t-test procedure allowed us to rule out race as a potential confounding variable for the tests of the three hypotheses. Two additional checks were made to safeguard the exploratory research questions from any bias due to race. In the first test no substantial changes were noted after race was included in the discriminant analysis procedure. The same effect was realized when race was forced into the multiple regression analysis. These results, in conjunction with the minimal changes seen in the t-test results, allows us to proceed with the study with confidence that race is not a confounding variable.

Having accepted the disproportionate race distribution, the obvious question that must be asked is why there was such a large number of African-Americans in the non-DUI alcoholic group and such a small number in both the DUI groups. This was clearly not anticipated in the study design, but the answer may lie in the area and clientele served by the two agencies used in the study. Both agencies provide outpatient alcohol treatment as well as the DUI education and treatment programs. It is quite possible that the clientele using each program came from very different sources.

On the one hand, the alcoholics using the agencies seem to be local individuals from the immediate vicinity of the agencies (city and declining mill town), and both these areas have a high percentage of African-American residents. The DUI offenders, on the other hand, are drawn from a much larger area, including the suburbs and surrounding communities, which are comprised of many more Caucasians. This is also consistent with national statistics that show that the majority of DUI offenders are Caucasian (Gusfield, 1988).

A second problem with the data distribution was that several of the scales were not normally distributed and did not have equal variances. The problem with heterogeneity of variances violates an assumption for the use of one-way ANOVA and the non-normal distribution violates an assumption for using discriminant analysis and multiple regression. The primary offending scales were those that comprised the Psychological Distress factor, including the factor itself, and the variable measuring the number of times DUI without being caught.

The reciprocal transformation was found to be the most effective solution for the psychological scales. It resulted in more homogeneous variances in Beck's Depression Inventory, the Hopelessness Scale and the DUSI Psychiatry Scale but did not improve the SCL 90-R Scales. The reciprocal transformation was also the most effective method to improve the skewness of the Psychological Distress factor which was used in the discriminant analysis and the multiple regression analysis.

Even though these transformations did not improve all the psychological scales, it is worth mentioning that the effort was made to correct the skewness and heterogeneity of variances. We will, therefore, rely on the robustness of the tests and the substantially significant differences to support the hypotheses and research questions.

The log transformation of "number of times DUI without being caught", on the other hand, was more successful. In this case the skewness was corrected and the homogeneity of variances was established. It should be noted, however, that the results of the multiple regression analysis were almost identical using the transformed or the non-transformed data. Likewise, the results of the one-way analysis of variance were very similar with both forms of the data. While this speaks to the robustness of the test statistic, it is more likely a reflection of the large differences between the mean scores of the groups.

Another limitation of the study is that the use of the discriminant function analysis to determine high and low risk DUI offenders is somewhat presumptive regarding the interpretation of the classification matrix. The matrix indicates the number of cases that are correctly classified and those which most closely fit the patterns of other groups. While the correct classifications are based on the discriminant function scores, the other classifications are based on the residual error scores and are, therefore, less accurate.

These presumptions were accepted, however, because they helped satisfy an important purpose of the study - to identify those first time DUI offenders who are high risk to repeat the offense. The classification from the discriminant function analysis allowed us to identify first time offenders who did not seem to fit into the first time offenders' group, either because of the characteristics identified through the three functions, or for other, unknown reasons. In any event, these first time offenders were set off from the other first time offenders and this, alone, may offer sufficient justification to provide additional treatment.

The design and applicability of the items on the questionnaire may also be considered suspect. Several respondents skipped basic demographics items, leading to the impression that the style of the answer sheet contributed to the oversight. This was not realized until late in the testing or it would have been corrected following the pretest. Also, some items in the initial section were too vague to provide data that contributed substantially to the study. Examples include the number of accidents regardless of fault, number of traffic tickets, driver's license status, number of years driving and the items on prior drug and alcohol or mental health treatment. While these provided general information, they left more questions asked than they answered.

Finally, use of the results of this study in an agency setting are limited by the exploratory nature of the outcomes. While numerous previous studies guided the selection of the variables and the statistical procedures optimistically point to an association between the measures and DUI behavior, it is speculative to assume the solution is accurate until it can be tested using a longitudinal outcome study that follows specific subjects. With the cooperation of state and local DUI agencies, and with more accurate recording of DUI offenses, such a study would not be extremely difficult to undertake. The problem is that the time period needed to identify recidivists should be at least five years, and possibly, up to ten years. While this presents obvious problems, the intermediate data at two or three years may be quite useful.

Policy Considerations

While program changes can originate at the grass roots level in the agencies, policy changes are also needed to make a substantial impact on the effect of the DUI treatment. States, like Pennsylvania, have made significant strides by improving DUI legislation. "Per se" laws exist in most states and administrative "per se" laws that virtually guarantee punishment of DUI offenders are increasing.

The current form of the Mortimer-Filkins test is useful but does not help agencies classify offenders into high and low risk. Policy changes at the state level are needed to modify this test to make it more useful to the agencies. Funding for additional studies that might identify more markers for DUI recidivism is needed so that agencies can be more effective with primary prevention efforts.

Finally, in the broader sense, society's outlook on DUI's as a whole needs to improve. Certainly, major strides have been made with the deglamorization of alcohol, the designated driver program, and even add campaigns by the beverage industry. The fact remains, however, that over 45% of fatal automobile crashes are alcohol related, unnecessarily killing over 22,000 individuals per year. The willingness to explore the multiple factors that contribute to this behavior may offer a more effective solution than is currently available.

Implications for Practice and Recommendations for Future Research

A number of implications for practice are apparent from the study. The discriminant analysis and multiple regression analysis procedures have shown us that the three factor scores, Psychological Distress, Alcohol Problems, and, to a lesser extent, Impulsivity/sensation-seeking behavior, can be used to discriminate group membership and to contribute to the prediction of the number of times an individual drives under the influence regardless of being caught. The idea that multiple behaviors contribute to the problem DUI behavior is consistent with Problem-Behavior Theory.

Although the non-DUI alcoholics scored significantly higher than the recidivists and the first time offenders did not score significantly lower than the recidivists as hypothesized, the concept of Problem-Behavior Theory continues to apply regarding DUI offenders. Treatment and education for DUI offenders is primarily focused on alcohol. This study demonstrates that other factors - other problem behaviors- can be shown to be associated with the problem DUI behavior. Researchers (Geller et al., 1988; Jessor, 1987; Johnson et al., 1989 & Mann, Vingilis & Stewart, 1988) have shown that multiple factors must be considered to effectively treat the DUI offender. The past research as well as this study continue to support a multiple problem approach to the treatment of DUI offenders.

There were some differences in this study's findings compared with previous research. Wilson (1992) found that it was useful to control for age and education. This was not necessary in the present study. Secondly, the results of the third hypothesis showed that the recidivists' group scored the lowest on measures of impulsivity/sensation-seeking whereas several studies identified this behavior in recidivists.

By using the variables that were effective in the discriminant analysis procedure, a consideration for curriculum development in DUI treatment programs would be to interject a substantial psychological component into the existing alcohol treatment program with a smaller component addressing impulsivity and sensation-seeking behavior. The psychological component might address coping skills, stress management, relationship enhancement, problem solving, social skills development, peer relationships, and dealing with depression and anxiety. The impulsivity/sensation-seeking component might address impulsive behavior, appropriate avenues for excitement, alternative actions in drinking situations such as use of designated driver or taxi, and effects of varying amounts of alcohol on response and coordination.

To return to the high risk first time offender for a moment, this particular classification is the one that agencies are, perhaps, most concerned with. While the recidivist is a known quantity, and is usually treated aggressively by agencies, the first time offender group is comprised of individuals who will never again drive under the influence, as well as those who will repeatedly drive intoxicated. One goal of agency programs is to identify those individuals who are high risk or more likely to repeat the DUI offense and provide more aggressive treatment programs to these targeted individuals in a preventive effort. This is cost and time effective for the agency and the individuals participating in the program, as well as having potentially beneficial traffic safety implications.

From a treatment perspective, the predicted group membership results may also be useful as a confrontational tool. It is not uncommon for most individuals to assume the posture that "it won't happen to me" regarding DUI. If a first time offender is presented with the fact that their profile is similar to others who have had repeat DUI offenses, it may have a positive therapeutic impact.

The DUI treatment agencies are involved in primary prevention. That is, they prevent DUI's by providing education and treatment to known DUI offenders. These are the individuals who are high risk to commit DUI's because they have already done so. The agencies must determine the best way to prevent DUI's through treating the offenders. The information from this study can be developed for use by agencies in this regard. The discriminant analysis formula, once tested through a longitudinal study, can allow agencies to identify high and low risk offenders and place them in the proper level of education or treatment. Once in the appropriate level of treatment, the findings point to developing a curriculum that extends beyond the traditional alcohol focus, incorporating alcohol, psychological, impulsivity and sensation-seeking components in a multi-problem behavior approach.

The final recommendation for practice involves modifying the cutoff scores on the Mortimer-Filkins test so that offenders are more realistically grouped according to their problem level. Scale scores on the various components of the test may be more useful than the single scoring method currently used. Consistent with the concept of Problem-Behavior Theory, these might give an indication of the specific problem behaviors that contribute to the DUI behavior. While it has been shown that the Mortimer-Filkins test as a whole is a good discriminator between first time offenders and recidivists, use of the single score generally results in almost all offenders being classified the same (problem drinkers). It may seem quite basic, but simply raising the cutoff score between problem drinkers and non-problem drinkers may improve the usefulness of the Mortimer-Filkins test substantially. Another option would be to dichotomize problem drinkers into problem drinkers and severe problem drinkers (or alcoholics), using a higher cutoff score for the latter category. This would provide a useful test score by which agencies might be able to classify offenders.

Recommendations for future research might focus on composition of the groups and manipulation of the variables. Although race was addressed as a possible confounding variable and found not to have substantial impact, we could have used a non-DUI alcoholic sample from an agency that matched the DUI sample more closely. Another consideration would have been to use a comparison group that consisted of non-alcoholic, normal drivers. Either of these samples could be tested for a future study.

In the analysis that explored the number of times an individual drove regardless of being caught, we could include a random sample of all drivers. Another limiting factor on this variable is the data collection method. Respondents were asked specific questions about the number of times they had driven after drinking, and while deliberate efforts were made to reduce Type II errors by eliminating denial, underestimation or other inaccuracies, the method remained subjective with no possible method to validate the results. However, the frequency of respondents who admitted driving under the influence more than 25 times per year was sufficiently high to give the impression that they were reasonably honest about their DUI incidents. Obviously, this observation, itself, is subjective, but indicates there was not universal or rampant denial by the respondents on this variable.

Finally, previous research guided the selection of the independent variables. While the studied variables appear to represent important markers for DUI offenders, more exploratory research is needed to broaden this list of variables. Time of day or day of the week of the offense may interact with personality type. Family history of alcoholism may be a marker. Location of the drinking episode before the DUI occurred may be significant and knowledge of this may assist law enforcement agencies to curb offenses. Many other possibilities exist and should be explored to expand the profile of the DUI offender.

Summary and Conclusions

The purpose of the study was to examine the DUI offender from the multiple problem behavior perspective and attempt to identify the factors that contribute to DUI recidivism. Three groups, including non-DUI alcoholics, first time offenders and recidivists were compared on a number of psychosocial and demographic variables. Twelve scale scores were reduced to three factors, including Psychological Distress, Alcohol Problems and Impulsivity/sensation-seeking behavior.

Not surprisingly, the alcoholics and recidivists were hypothesized to have more alcohol problems than the first time offenders and this was shown to be true. The second hypothesis, that recidivists would have more psychological distress than the other two groups was not upheld. In fact, the non-DUI alcoholics had more problems. Finally, the third hypothesis, that recidivists would score higher on impulsivity/sensation seeking was also not upheld. The non-DUI alcoholics scored highest and the recidivists scored lowest.

Four exploratory research questions were addressed in the study. The first found that DUI offenders can be differentiated into high and low risk groups by observing the characteristics of non-DUI alcoholics, first time offenders and recidivists and subjecting them to a discriminant analysis procedure. The discriminant function scores can then be applied to the formula for group classification. The second question identified the amount of contribution of the discriminating variables, with Alcohol and Psychological Distress contributing the most and Impulsivity/sensation-seeking contributing to a smaller amount of the explained variance.

The third exploratory question pursued the relationship between the factor variables and the number of times a person drove under the influence regardless of being caught. A relationship was found here with the variables contributing in approximately the same way as in the discriminant analysis. Finally, the last question examined the Mortimer-Filkins test and found that it had a good ability to discriminate between groups but the cutoff scores were too low to be beneficial to the agencies as a discriminator between first time offenders and recidivists.

The conclusions from the study are that multiple characteristics and behaviors contribute to the problem DUI behavior. The most effective treatment programs will recognize this and develop curricula that incorporates multiple issues, including alcohol, psychological, impulsivity and sensation-seeking. Naturally, alcohol issues will be the primary focus, but the other factors contribute to the DUI behavior and are integral to a successful treatment program.

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APPENDICES

1. Explain the purpose of the study (DUI Group)

Dr. Sutton, a psychologist who has done extensive research on DUI's and alcoholism, and Mr. Astley, a doctoral student at the University of Pittsburgh, are conducting a study on the characteristics of people in DUI and alcohol treatment programs. The study will involve asking you to complete a battery of psychological and personal interest tests and to answer a few questions about yourself. You will also be asked to complete a short performance test that will take a few minutes. To avoid duplicating information, we will compare these test results with some of the results of your CRIN evaluation.

The results of the study will be kept completely confidential and will not change your status in this program at all. Regardless of the results of the testing, your status in the DUI program will not be lengthened or shortened. You may, however, benefit from the results of the evaluation and will be informed of any elevated results. It will then be your option to consider additional follow-up but you will not be required to do anything if you do not wish. To insure confidentiality, we will use a name sticker on the Answer Sheet. This will be removed after scoring and we find no elevated results.

A Consent Form is required because the study is affiliated with the University of Pittsburgh.

In short, the study is designed to learn characteristics of individuals in DUI and alcohol treatment programs. You may gain from the evaluation, but with no risk of changing your status in the program.

2. Administer materials

Distribute the Consent form, Comprehensive Answer Sheet, and Test packages. Ask participants to sign the Consent Form and write their name on the removable sticker on the Answer Sheet.

3. Give Instructions

(It's best to administer the test in a group setting, but this is at the discretion of the instructor.) After distributing the 3 items above, collect the Consent forms separately. Instruct the group to begin by completing the top of the Comprehensive Answer Sheet and then following the instructions on the test package. Ask participants to NOT write in the packages so we can re-use them. Inform them that during the test, you will be asking them to do the Trails individually in the next room.

4. Trails A & B and additional questions

While the group is completing the tests, pull individuals, one at a time, from the room to administer the Trails test. This should take no more than 3-5 minutes per person. The test battery should take 45-60 minutes to complete. If there are more than 12-15 persons in the group, you may need more time to complete the Trails test. We suggest doing this during a film by continuing to pull individuals for short periods, if necessary, while others view the film. Before beginning the Trails, state or ask the following:

1. One of the aspects of the research project is to explore DUI offenses. However, a DUI is simply a measure of the number of times an individual was caught driving under the influence. It has nothing to do with the number of times one actually drove under the influence. We're going to ask you how many times you actually drove under the influence. We want you to understand that this is purely for research purposes and will

not affect your status in the program. [At this point, ask the person's weight and use it to determine the number of ounces of alcohol to apply... under 120 pounds = 4 ounces; 120-160 pounds = 5 ounces; 160 - 200 = 6 ounces; 200 - 240 = 8 ounces] *How many times in the past year did you drive after drinking (x) ounces of alcohol?* Record the response in the gray area of the Answer Sheet.

2. Ask if there was prior D&A or mental health (counseling) treatment and if they volunteered for this. Mark these responses in the gray area of the Answer Sheet. Also, record the Mortimer-Filkins score from the CRIN in the gray area. (You may have to obtain the M-F score later).

3. Complete Trails A&B and record the number of seconds in the gray area.

4. Last, but most important, check the Answer Sheet for name and completeness.

Approved: ___/___/93
Psychosocial IRB
University of Pittsburgh

CONSENT TO ACT AS A SUBJECT IN AN EXPERIMENTAL STUDY

TITLE: Characteristics of subjects in a DUI or alcohol treatment program.

INVESTIGATORS: Lawrence Sutton, Ph. D.
Psychologist
P.O. Box 10345
Pittsburgh. PA 15234
Telephone: 531-1776

William Astley, M.S.W.
Ph. D. Candidate
School of Social Work
University of Pittsburgh, PA 15260
Telephone: 624-6311

DESCRIPTION: I understand that I have been asked to participate in this research project which is a study of the characteristics of individuals in a DUI or alcohol treatment program.

The project involves approximately 250 adult male and female subjects from two agencies. Your assistance is needed to directly learn more about the characteristics of individuals participating in DUI or alcohol treatment programs. You will be needed for one session, approximately one hour in length, with no anticipated follow-ups. You will be asked to complete several questionnaires that require you to answer true/false, yes/no, or to choose the best selection. The instruments will ask questions about your feelings, life experiences, and preferences in general, and about your use of alcohol. You will also be asked to answer a few basic questions about your background. Finally, you will be asked to complete a short (2-3 minute) performance test that will be administered by the investigators. This information will be combined with previous information that was obtained during your Court Reporting Network evaluation (CRN) that was conducted at the Allegheny County office.

RISKS AND BENEFITS: The only foreseeable risk is that you may view some of the questions as sensitive or personal in nature. None of the questions, however, are embarrassing or beyond the limits of common conversation. Your participation will allow the investigators to learn more about individuals in DUI and alcohol treatment programs and hopefully, improve such programs.

COSTS AND PAYMENTS: None.

CONFIDENTIALITY: I understand that information about me obtained from this research, including information from questionnaires or interviews will be kept strictly confidential. Information will be kept in locked files and only Dr. Sutton, Mr. Astley, or research assistants will have access to it. I understand that my name will not be needed in any way in this research and, once my answer sheet is scored and paired with my CRN report, all identifying marks will be removed. I understand that my research records, like hospital records, may be subpoenaed by court order. It has been explained to me that my identity will not be revealed in any description or publication of this research. Therefore, I consent to publication for scientific purposes.

Initials_______

I understand that, because some of the questions are clinical in nature, the investigators have a responsibility to follow up on any serious clinical situation. If this occurs, I understand that I will be notified directly and referral for treatment will only be made with my consent.

RIGHT TO REFUSE OR END PARTICIPATION: I understand that I may refuse to participate in this study or withdraw any time and that my decision will not adversely affect my treatment at this institution or cause a loss of benefits to which I might otherwise be entitled.

VOLUNTARY CONSENT: The investigators have explained all of the above to me and have answered my questions. I consent to the release of the results of my CRN evaluation and understand that these results will have all identifying information removed after they are paired with the test results for this research. I understand that full confidentiality will be maintained and that the researchers are interested in analysis of the collective data and not individual information about any one particular subject. I understand that any future questions I have about this research will be answered by Dr. Sutton or Mr. Astley, whom I may call at 875-8500. Any questions I have about my rights as a research subject will be answered by the Office of Senior Vice Chancellor for Health Sciences, University of Pittsburgh, at 647-8475. By signing this form I agree to participate in the study.

Subject's signature

Witness

Date

INVESTIGATORS CERTIFICATION:

I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participating in this research study, have answered any questions that have been raised, and have witnessed the above signature.

Investigator/Research Staff

Date

Comprehensive Answer Sheet

I.D. ________ Age______ Sex______ Marital Status -- Single / Married / Separated / Divorced / Widow/er

Race -- Black /Caucasian /Hispanic /Oriental /Other Breath Alcohol Content (BRAC) at time of DUI______

Years you have been driving_____ Education - highest grade or degree________ Monthly Income______

Traffic tickets received since you started driving ______ # Accidents you've had -regardless of fault _______

DUI Offenses ______ At the time of your DUI, did you have: a) Insurance_____ b) Valid license_____

[illegible] # Times DUI_____ Prior D&A Tmt_____ Did you volunteer?_____

[illegible] M-P Score_____ Prior counseling (MH) Tmt_____ Did you volunteer_____

MacAndrews - Answer TRUE or FALSE to all the questions

1_____
2_____
3_____
4_____
5_____
6_____
7_____
8_____
9_____
10_____
11_____
12_____
13_____
14_____
15_____
16_____
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37_____
38_____
39_____
40_____
41_____
42_____
43_____
44_____
45_____
46_____
47_____
48_____
49_____
50_____
51_____

Examiner's Use
Score _____

****

MAST - Answer YES or NO to all the questions

1_____
2_____
3_____
4_____
5_____
6_____
7_____
8_____
9_____
10_____
11_____
12_____
13_____
14_____
15_____
16_____
17_____
18_____
19_____
20_____
21_____
22_____
23_____
24_____
25_____

Examiner's Use
Score _____

****

B.D.I. Answer 0, 1, 2, or 3 for each group of statements. Please answer all the questions.

1_____
2_____
3_____
4_____
5_____
6_____
7_____
8_____
9_____
10_____
11_____
12_____
13_____
14_____
15_____
16_____
17_____
18_____
19_____ (Yes_____ No_____)
20_____
21_____

Examiner's Use
Score _____

****

SCL-90-R Answer 0, 1, 2, 3, or 4 to each question. Please answer all the questions.

1______
2______
3______
4______
5______
6______
7______
8______
9______
10______
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12______
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14______
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36______
37______
38______
39______
40______
41______
42______
43______
44______
45______
46______
47______
48______
49______

Examiner's Use
OC______
D______
A______
PI______
PS______

****

B.H.S. Answer TRUE or FALSE to all the questions.

1______
2______
3______
4______
5______
6______
7______
8______
9______
10______
11______
12______
13______
14______
15______
16______
17______
18______
19______
20______

Examiner's Use
Score______

****

D.Q. - I.S.S. Answer YES or NO to questions 1 - 40. Please answer all the questions.

1______
2______
3______
4______
5______
6______
7______
8______
9______
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11______
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13______
14______
15______
16______
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19______
20______
21______
22______
23______
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25______
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28______
29______
30______
31______
32______
33______
34______
35______
36______
37______
38______
39______
40______

Examiner's Use
II______
IV______

Answer TRUE or FALSE to questions 41 - 59 on the D.Q. - I.S.S. Please answer all the questions.

41______
42______
43______
44______
45______
46______
47______
48______
49______
50______
51______
52______
53______
54______
55______
56______
57______
58______
59______

Examiner's Use
Im______
SS______

****